THE 2018 SOUTH DAKOTA INTEGRATED REPORT FOR SURFACE WATER QUALITY ASSESSMENT

Protecting South Dakota's Tomorrow...Today

Prepared By
SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

STEVEN M. PIRNER, SECRETARY

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

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denr.sd.gov

March 30, 2018

Douglas H. Benevento, Regional Administrator
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, CO. 80202-1129

Re: Final 2018 South Dakota Integrated Report

Dear Mr. Benevento:

I am pleased to submit to you the 2018 South Dakota Integrated Report, with supporting information, as required under Sections 305(b) and 303(d) of the Clean Water Act.

This submittal represents a major effort by this department as well as interested members of the South Dakota public. The 2018 report is one of the most comprehensive reviews of water quality data completed in South Dakota to date.

The report and supporting information were uploaded to EPA's ATTAINS system on March 30, 2018. An electronic copy of the report is also available via our homepage at: http://denr.sd.gov/documents/18irfinal.pdf

We look forward to your agency's full approval of our 2018 Integrated Report. We also want to thank you and your staff for assistance during the development process.

Sincerely,

Steven M. Pirner, PE
Secretary

Cc: Darcy O' Connor
Elizabeth Rogers

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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APR 1 2 2018

Ref: 8WP-CWQ

Steven M. Pirner, Secretary
Department of Environment & Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Re: Clean Water Act Section 303(d) Total Maximum Daily Load (TMDL) Waterbody List

Dear Mr. Pirner:

Thank you for your submittal of the South Dakota Department of Environment & Natural Resources (DENR) 2018 Water Quality Integrated Report received March 30, 2018. The Environmental Protection Agency Region 8 has conducted a complete review of the Clean Water Act Section 303(d) waterbody list (Section 303(d) list) and supporting documentation and information. The EPA has determined that South Dakota's 2018 Section 303(d) list meets the requirements of Section 303(d) of the Clean Water Act (CWA) and the EPA's implementing regulations found at 40 C.F.R. Part 130 and approves South Dakota's 2018 Section 303(d) list.

The EPA's approval of South Dakota's 2018 Section 303(d) list extends to waterbodies on the list with the exception of those waters that are within Indian country, as defined at 18 U.S.C. § 1151. Indian country generally includes lands within the exterior boundaries of the following Indian reservations located within the State of South Dakota: Cheyenne River Reservation, Crow Creek Reservation, Flandreau Indian Reservation, Lower Brule Reservation, Pine Ridge Indian Reservation, Rosebud Indian Reservation, Standing Rock Reservation, Yankton Sioux Reservation; any land held in trust by the United States for an Indian tribe; and any other areas which are "Indian country" within the meaning of 18 U.S.C. § 1151. Lands removed from the Yankton Sioux Reservation by judicial action are not considered lands within the exterior boundaries of an Indian reservation. Today's action is not intended as an action to approve or disapprove the Section 303(d) list's waters within Indian country. The EPA, or eligible Indian Tribes, as appropriate, will retain CWA Section 303 responsibilities for waters in Indian country.

The attachment describes the statutory and regulatory requirements of the CWA Section 303(d) list and a summary of the EPA's review of South Dakota's compliance with each requirement. The EPA appreciates your work to produce South Dakota's 2018 Section 303(d) list. If you have questions, the most knowledgeable EPA staff person is Liz Rogers and she may be reached at (303) 312-6974 or rogers.liz@epa.gov.

Sincerely,

Darcy O'Connor
Assistant Regional Administrator
Office of Water Protection

Attachment

cc: Shannon Minerich, SDDENR
Paul Lorenzen, SDDENR

Liz Rogers, EPA, 8-WP

Review of South Dakota's 2018 Section 303(d) Waterbody List

Attachment to letter from Martin Hestmark, Acting Assistant Regional Administrator, Office of Ecosystems Protection and Remediation, US EPA, Region VIII to Steven M. Pirner, Secretary South Dakota Department of Environment & Natural Resources

Date of Transmittal Letter from State: March 30, 2018
Date of Receipt by The EPA: March 30, 2018

I. Introduction

South Dakota Department of Environment & Natural Resources (DENR) submitted their final 2018 Integrated Report (IR) to the Environmental Protection Agency (EPA) on March 30, 2018. Based on our review of the State's CWA Section 303(d) water body list ("Section 303(d) list"), the EPA is approving South Dakota's 2018 list. The purpose of this review document is to describe the rationale for EPA's approval. The EPA's approval of South Dakota's 2018 Section 303(d) list extends to waterbodies on the list with the exception of those waters that are within Indian country, as defined at 18 U.S.C. § 1151. Indian country generally includes lands within the exterior boundaries of the following Indian reservations located within the State of South Dakota: Cheyenne River Reservation, Crow Creek Reservation, Flandreau Indian Reservation, Lower Brule Reservation, Pine Ridge Indian Reservation, Rosebud Indian Reservation, Standing Rock Reservation, Yankton Sioux Reservation; any land held in trust by the United States for an Indian tribe; and any other areas which are "Indian country" within the meaning of 18 U.S.C. § 1151. Lands removed from the Yankton Sioux Reservation by judicial action are not considered lands within the exterior boundaries of an Indian reservation. Today's action is not intended as an action to approve or disapprove the Section 303(d) list's waters within Indian country. The EPA, or eligible Indian Tribes, as appropriate, will retain CWA Section 303 responsibilities for waters in Indian country.

In March 2011, the EPA issued guidance for integrating the development and submission of 2012 Section 305(b) water quality reports and Section 303(d) lists of impaired waters. This guidance, and previous EPA guidance, recommends that States develop an Integrated Report of the quality of their waters by placing all waters into one of five assessment categories. By following this guidance, Category 5 of the Integrated Report is the State's Section 303(d) list. The EPA's action in review and approval of this document is only on Category 5 that comprises the Section 303(d) list within the Integrated Report.

The EPA reviewed the methodology used by the State in developing the Section 303(d) list and the State's description of the data and information it considered. The EPA's review of South Dakota's 2018 Section 303(d) list is based on EPA's analysis of whether the State reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed.

South Dakota's 2018 list is considered an update of the State's 2016 list, and as such, the Section 303(d) list the EPA is approving today is comprised of 153 assessment units (206 waterbody/pollutant combinations), compared with 143 assessment units included on the 2016 list. States may add and take waters off their Section 303(d) lists based on several factors. For the 2018 cycle, South Dakota removed 31 waterbody/ pollutant combinations from its year 2016 list.

II. Statutory and Regulatory Background

A. Identification of Water Quality Limited Segments (WQLSs) for Inclusion on Section 303(d) List

Section 303(d)(1) of the CWA directs States to identify those waters within its jurisdiction for which effluent limitations required by Section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The Section 303(d) listing requirement applies to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of Section 303(d).

The EPA regulations implementing Section 303(d) require States to identify water quality limited segments (WQLSs) that need TMDLs. 40 C.F.R. § 130.7(b). WQLSs[1] are defined in regulation as segments "where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of the technology-based effluent limitations required by sections 301(b) and 306 of the Act." 40 C.F.R. § 130.2(j). Thus, States do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the CWA; (2) more stringent effluent limitations required by State or local authority; and (3) other pollution control requirements required by State, local, or federal authority. (40 C.F.R. §130.7(b)(1).)

B. Consideration of Existing and Readily Available Water Quality-Related Data and Information

In developing Section 303(d) lists, States are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as not meeting designated uses, or as threatened, in the State's most recent CWA Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any Section 319 nonpoint assessment submitted to the EPA. (40 C.F.R. §130.7(b)(5)). In addition to these minimum categories, States are required to consider any other data and information that is existing and readily available. The EPA's 1991 Guidance for Water Quality-Based Decisions describes categories of water quality-related data and information that may be existing and readily available. (See Guidance for Water Quality-Based Decisions: The TMDL Process, The EPA Office of Water, April 1991.) While States are required to evaluate all existing and readily available water quality-related data and information, States may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring States to assemble and evaluate all existing and readily available water quality-related data and information, the EPA regulations at 40 C.F.R. §130.7(b)(6) require States to include, as part of their submissions to the EPA, documentation to support decisions using or excluding particular data and information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the

[1] WQLSs may also be referred to as "impaired waterbodies" or "impairments" throughout this document.

data and information used to identify waters; (3) a rationale for any decision not to use any existing and readily available data and information 40 C.F.R. §130.7(b)(5), and (4) any other reasonable information requested by the Region.

C. Priority Ranking

The EPA regulations also codify and interpret the requirement in Section 303(d)(1)(A) of the CWA that States establish a priority ranking for listed waters. The regulations at 40 C.F.R. §130.7(b)(4) require States to prioritize waters on their Section 303(d) lists for TMDL development, and also to identify those WQLSs targeted for TMDL development in the next two years. In prioritizing and targeting waters, States must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. (CWA Section 303(d)(1)(A)). As long as these factors are taken into account, the CWA provides that States establish priorities. States may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs such as wasteload allocations for permits, vulnerability of particular waters as aquatic habitats, recreational, economic, and aesthetic importance of particular waters, degree of public interest and support, and State or national policies and priorities. (See 57 Fed. Reg. 33040, 33045 (July 24, 1992), and the EPA's 1991 Guidance).

D. Applicable Water Quality Standards

For purposes of identifying waters for the Section 303(d) list, the terms "water quality standard applicable to such waters" and "applicable water quality standards" refer to those water quality standards established under Section 303 of the Act. On April 27, 2000, the EPA promulgated a rule under which the "applicable standard" for Clean Water Act purposes depends on when the relevant States or authorized Tribes promulgated that standard. Standards that States or authorized Tribes have promulgated before May 30, 2000 are effective upon promulgation by the States or authorized Tribes. Standards that States or authorized Tribes promulgated on or after May 30, 2000 become effective only upon EPA approval. 40 C.F.R §131.21(c). The EPA interprets CWA Section 303(d) to require EPA establishment or approval of section 303(d) lists only for impairments of waters with Federally-approved water quality standards.

III. Analysis of South Dakota's Submission

A. Background

In reviewing South Dakota's submittal, the EPA first reviewed the methodology used by the State to develop its 2018 Section 303(d) list in light of South Dakota's approved water quality standards, and then reviewed the actual list of waters. The State's Assessment Methodology starts on Page 20 of the Integrated Report. The EPA has reviewed the State's submission, and has concluded that the State developed its Section 303(d) list in compliance with Section 303(d) of the CWA and 40 C.F.R. §130.7. The EPA's review is based on its analysis of whether the State reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed. South Dakota considered all data and information pertaining to the categories under 40 C.F.R. §130.7(b)(5), and properly listed WQLSs under 40 C.F.R. §130.7(b)(1).

In previous guidance, The EPA recommended that States develop an Integrated Report of the quality of their waters by placing all waters into one of five assessment categories. (See EPA's Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act, July 21, 2005.) By following this guidance, Category 5 of the Integrated Report is the State's

Section 303(d) list. The EPA's action in review and approval of this document is only on Category 5 that comprises the Section 303(d) list within the Integrated Report.

The State's list was submitted to EPA Region 8 enclosed with correspondence dated March 30, 2018 from Steven M. Pirner, Secretary, Department of Environment & Natural Resources, in a document entitled "*Final 2018 South Dakota Integrated Report.*"

The year 2018 Integrated Report submitted to the EPA from the South Dakota DENR consisted of the following portions that are necessary for the Section 303(d) waterbody list:

- **Waterbodies and corresponding pollutants that make up the State's Section 303(d) list** (See Appendix D, Pages 167-174: 303(d) Summary).
- **Prioritization of waterbodies for TMDL development** (See Appendix D, Pages 167-174: 303(d) Summary).
- **Identification of waters targeted for TMDL development over the next biennium** (See Appendix D, Pages 167-174: 303(d) Summary).

The EPA's approval action of South Dakota's year 2018 Section 303(d) list extends only to the items listed immediately above.

The 2018 Section 303(d) waters are found in the State's Integrated Report, Appendix D (303(d) List of South Dakota's Impaired Waters Requiring TMDL studies). Appendix D contains the following information for each waterbody: assessment unit identifier, waterbody name and location, cause of impairment ("pollutant"), cycle first listed, TMDL Priority, and TMDL Schedule.

B. Identification of Waters and Consideration of Existing and Readily Available Water Quality-Related Data and Information

The EPA has reviewed South Dakota's description of the data and information it considered for identifying waters on the Section 303(d) list. The EPA concludes that the State properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 C.F.R. §130.7(b)(5) and properly identified and listed WQLSs as required by 40 C.F.R. §130.7(b)(1). In particular, the State relied on information from the 2018 Section 305(b) water quality assessments, assessments performed under the CWA Section 319 non-point source program, as well as data and information obtained through an extensive process to solicit information from State, federal and citizen sources. The State's evaluation of data and information in each of these categories is described below.

- *Waters identified by the State in its most recent section 305(b) report as "partially meeting" or "not meeting" designated uses or as "threatened"* (40 C.F.R. §130.7(b)(5)(i)): South Dakota produced a 2018 Integrated Report consistent with the EPA's guidance regarding combined CWA 305(b) reports and 303(d) lists. The EPA concludes that South Dakota made listing decisions using all existing and readily available data and information in development of its 2018 Section 303(d) waterbody list.

- *Waters for which dilution calculations or predictive models indicate non-attainment of applicable water quality standards* (40 C.F.R. §130.7(b)(5)(ii)): South Dakota assembled and evaluated information from past and anticipated dilution calculations and predictive modeling. The EPA concludes that South Dakota properly considered waters for which dilution calculations or predictive models indicate nonattainment of applicable water quality standards in development of its 2018 Section 303(d) waterbody list.

• *Waters for which water quality problems have been reported by local, State, or federal agencies; members of the public; or academic institutions* (40 C.F.R. §130.7(b)(5)(iii)): The State solicited data and information in preparation for the 2018 Section 303(d) list. Data and information obtained as a result of this effort were evaluated and considered. The State's submittal identified several entities that contributed data or information and responded to public comments related to assessments for individual waterbodies.

• *Waters identified by the State as impaired or threatened in a nonpoint assessment submitted to EPA under Section 319 of the CWA or in any updates of the assessment* (40 C.F.R. §130.7(b)(5)(iv)): The State's 2018 Section 303(d) list includes all waters that have data to support nonpoint source pollution impairment. South Dakota's listing approach and methodologies direct CWA Section 319 activities and resources to the highest priorities. Watershed assessments are often conducted for waterbodies that are already listed in order to collect current data to support TMDL development.

Based upon its review, The EPA concludes that, with regard to the waters identified in the State's 2018 Section 303(d) list, the State's process for developing that list substantially meets the requirements of 40 C.F.R. §130.7(b)(i-iv) regarding the consideration of all existing and readily available water quality-related data and information, as well as the requirements of 40 C.F.R. Part 130.7(b)(1).

C. Waters Removed from the Section 303(d) List

In addition to adding WQLSs that require TMDLs to its 303(d) list, a State may also remove waters from its list when such removal is justified. The EPA has identified four reasons that justify the removal of a water from a State's 303(d) list. These are:

1. The State has prepared and the EPA has approved a TMDL for the listed water.
2. The original basis for listing the water was incorrect.
3. New data or information indicates that the applicable water quality standard for the water is being met and its designated uses are fully supported.
4. The State has adopted and the EPA has approved a site-specific water quality standard for the water, and the new water quality standard is being met.

A full accounting of waters removed from the State's 2016 303(d) list is provided on Page 19 and in Appendix B, Pages 162-164 of the Integrated Report. The States removal decisions and stated justifications are summarized below:

Number of Waterbody-Pollutant Combinations Removed from List	
Reason	**2018**
TMDL approved or established by EPA (4a)	2
Applicable WQS attained: based on new data	15
Applicable WQS attained: reason for recovery unspecified	1
WQS no longer applicable	13
Total	31

In reviewing the State's 2018 Section 303(d) waterbody list, The EPA carefully considered South Dakota's decision to remove certain waterbody-pollutant combinations from the State's 2016 303(d) list, its justification from those removals, and the methodology it used in making those decisions. The EPA concludes that the removal decisions identified in the Integrated Report are based on all existing and readily available water quality-related data and information, and that the removal decisions are properly justified.

D. Priority Ranking and Schedule for Development of TMDLS for Listed Waters and Pollutants

Pursuant to the listing methodology set out in the State's submittal, South Dakota prioritized WQLSs for TMDL development into two Priority Areas: Priority 1 (Documented health problems or a threat to human health; Waters listed as impaired because of bacteria, TSS, temperature in waters assigned coldwater fisheries, or mercury in fish flesh; Waters where TMDL development is expected during the next two years; or Waters with documented local support for water quality improvement) and Priority 2 (Waters where local support for TMDL development is expected but not documented; Waters having impairments not listed as Priority 1; Waters with no evident local support for water quality improvements; or Waters where impairments are believed to be due largely to natural causes). South Dakota's TMDL prioritization strategy is fully described starting on Page 13 of South Dakota's Integrated Report.

The EPA reviewed the State's priority ranking of listed waters for TMDL development, and concluded that the State properly took into account the severity of pollution and the uses to be made of such waters, as required by 40 C.F.R. 130.7(b)(4), as well as other relevant factors such as imminent human health problems or local support for water quality improvement. In addition, the EPA concluded that the State listed WQLS targeted for TMDL development in the next two years, as required by 40 C.F.R. 130.7(d).

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IV. Final Recommendation on South Dakota's 2018 Section 303(d) List Submittal

After careful review of South Dakota's final Section 303(d) list submittal package, the EPA has determined that South Dakota's 2018 Section 303(d) list meets the requirements of Section 303(d) of the CWA and EPA's implementing regulations and approves South Dakota's 2018 Section 303(d) list.

V. References

The following list includes documents that were used directly or indirectly as a basis for the EPA's review and approval of the State's Section 303(d) waterbody list. This list is not meant to be an exhaustive list of all records, but to provide the primary documents the Region relied upon in making its decisions to approve the State's list.

40 C.F.R. Part 130 Water Quality Planning and Management

40 C.F.R. Part 131 Water Quality Standards

July 29, 2005, Memorandum from Diane Regas, Director, Office of Wetlands, Oceans, and Watersheds, US EPA to Water Division Directors transmitting EPA's "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act"

October 12, 2006, Memorandum from Diane Regas, Director, Office of Oceans, Wetlands, and Watersheds entitled *Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.*

May 5, 2009, Memorandum from Suzanne Schwartz, Acting Director, Office of Wetlands, Oceans, and Watersheds, entitled *Information Concerning 2010 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.*

March 21, 2011, Memorandum from Denise Keehner, Director, Office of Wetlands, Oceans, and Watersheds, entitled *Information Concerning 2012 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.*

April 1991, "Guidance for Water Quality-Based Decisions: The TMDL Process," EPA 440/4-91-001.

July 24, 1992 Federal Register Notice, *40 C.F.R. Parts 122, 123, 130, Revision of Regulation*, 57 FR 33040.

August 8, 1997, Memorandum from Robert Perciasepe, Assistant Administrator for Water, US EPA, regarding "New Policies for Establishing and Implementing TMDLs."

September 1997, Guidance from Office of Water, Headquarters, US EPA regarding "Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates" Supplement, EPA-841-B-97-002B.

November 5, 1997, Memorandum from Tudor Davies, Director, Office of Science and Technology to Water Management Division Directors entitled "Establishing Site Specific Aquatic Life Criteria Equal to Natural Background."

August 23, 1999, Federal Register Notice. *Proposed Revisions to the Water Quality Management and Planning Regulations,* 64 FR 46012.

April 27, 2000, Federal Register Notice, *EPA Review and Approval of State and Tribal Water Quality Standards*, 65 FR 24641.

February 28, 2012, letter from Elizabeth Rogers, Monitoring and Assessment Team, Water Quality Unit, Ecosystems Protection Program, US EPA Region VIII, to Shannon Minerich, Surface Water Quality Program, South Dakota Department of Environment and Natural Resources.

September 3, 2013, US EPA Memorandum, Information Concerning 2014 Clean Water Act 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions.

September 3, 2013, US EPA Memorandum, Information Concerning 2014 Clean Water Act 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions.

March 27, 2014, South Dakota Department of Environment & Natural Resources response regarding EPA's comments on South Dakota's 2014 draft Integrated Report.

August 13, 2015, US EPA Memorandum, Information Concerning 2016 Clean Water Act Sections 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions.

June 7, 2016, letter from Elizabeth Rogers, Monitoring and Assessment Team, Water Quality Unit, Ecosystems Protection Program, US EPA Region VIII, to Shannon Minerich, Surface Water Quality Program, South Dakota Department of Environment and Natural Resources.

August 25, 2016, South Dakota Department of Environment & Natural Resources response regarding EPA's comments on South Dakota's 2016 draft Integrated Report.

December 22, 2017, USEPA Memorandum, Information Concerning 2018 Clean Water Act Sections 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions.

March 19, 2018, letter from Elizabeth Rogers, Monitoring and Assessment Team, Water Quality Unit, Office of Water Protection, US EPA Region VIII, to Shannon Minerich, Surface Water Quality Program, South Dakota Department of Environment and Natural Resources.

SOUTH DAKOTA WATER QUALITY
WATER YEARS 2012-2017 (streams)
and
WATER YEARS 2007-2017
(lakes and mercury in fish tissue)

The 2018 South Dakota Integrated Report
Surface Water Quality Assessment

By the State of South Dakota

Pursuant to
Sections 305(b), 303(d), and 314 of the
Federal Water Pollution Control Act

South Dakota Department of Environment and
Natural Resources

Steven M. Pirner, Secretary

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I. INTRODUCTION

This integrated 305(b) and 303(d) report (Integrated Report (IR)) was prepared by the South Dakota Department of Environment and Natural Resources (DENR) pursuant to Sections 305(b), 303(d), and 314 of the Federal Water Pollution Control Act (P.L. 95-217), also known as the Clean Water Act (CWA).

This document provides an assessment of South Dakota's surface water resources and identifies impaired waterbodies that require Total Maximum Daily Load (TMDL) development. It is the intent of this report to inform the citizens of South Dakota and the United States Environmental Protection Agency (EPA) of the condition of state surface water resources and to serve as the basis for management decisions by government and other entities for the protection of surface water quality.

DENR uses the results of the Integrated Report as a tool to stimulate development and prioritization of nonpoint source (NPS) projects and other pollution control activities. This report is shared with the Nonpoint Source Task Force to provide information and guidance. The Nonpoint Source Program also uses this document to supplement news articles released through the DENR Information and Education Program.

States, territories and authorized tribes are required to use EPA's "Assessment and Total Maximum Daily Load Tracking and Implementation" system (ATTAINS) to develop integrated report information. ATTAINS is a web-based interface that provides states with a mechanism to record, manage and report all 305(b), 303(d) and 314 information. Reporting tools available in ATTAINS provide EPA and the public with a method to review IR information including status of waters at the national, state and site-specific level. For example, assessment unit information like waterbody name, size, category, use support, causes of nonsupport, parameters that meet standards, linked TMDLs, and more information is available. DENR used the ATTAINS system to develop the 2018 IR. To learn more about EPA's ATTAINS system visit the following web link:

https://www.epa.gov/waterdata/assessment-and-total-maximum-daily-load-tracking-and-implementation-system-attains

For the 2018 reporting cycle, DENR made the decision to produce an IR document consistent with past reporting cycles. DENR will consider using ATTAINS as the main reporting mechanism for future IR cycles. In the interim, DENR would like to give government entities and the general public time to become familiar with ATTAINS reporting capability. Reporting results from South Dakota's 305(b), 303(d) and 314 information can be accessed at the following ATTAINS web link:

https://ofmpub.epa.gov/waters10/attains_state.control?p_state=SD.

The surface water quality assessments listed in this report rely primarily on the analyses of data generated by DENR, outside organizations, and DENR project sponsors. Those groups include the United States Geological Survey (USGS), United States Army Corps of Engineers (USACE), Minnesota Pollution Control Agency (MPCA), Nebraska Department of Environmental Quality (NE DEQ), the cities of Watertown, Brookings, and Sioux Falls, East Dakota Water Development District (EDWDD), Pennington County, Belle Fourche River Watershed Partnership, Day County Conservation District, Moody County Conservation District, Pennington County, Black Hills Resource Conservation & Development, RESPEC Consultants, and South Dakota State University (SDSU). DENR greatly appreciates data submissions from outside organizations and project sponsors. These submissions provide DENR with increased monitoring data which improve the confidence of support determinations. Outside organizations may also monitor waterbodies that are not currently monitored by DENR, therefore increasing the extent of waterbodies included in the Integrated Report. While this assessment is as comprehensive as resources permit, some of the state's surface water quality problems may not be identified or documented in this report.

II. EXECUTIVE SUMMARY

Surface Water Quality

South Dakota has about 9,726 miles of perennial rivers and streams (Table 1) and about 87,780 miles of intermittent streams. About 5,916 stream miles have been assessed in the past five years (October 2012 to September 2017). During this 5-year interval, 26.5% of assessed stream miles were found to support all their assigned beneficial uses; 73.5% did not support one or more beneficial uses. DENR has listed a total of 90 different streams or stream segments as impaired requiring TMDL development.

Similar to previous reporting periods, nonsupport for fishery/aquatic life uses was caused primarily by total suspended solids (TSS) from agricultural nonpoint sources and natural origin. Nonsupport for recreational uses was primarily caused by *Escherichia coli* (*E. coli*) contamination from livestock and wildlife contributions.

Equally noteworthy, 100% of stream miles assessed for the following parameters met water quality standards: alkalinity, ammonia, arsenic, chloride, chromium, copper, cyanide, lead, mercury (water column), nickel, nitrate, radium, selenium, silver, sulfate, and zinc.

In addition to rivers and streams, South Dakota has 575 lakes and reservoirs with specific aquatic life and recreational beneficial use classifications. The four Missouri River mainstem reservoirs are not included in the total lake acres but are included in the monitored river mileage.

DENR assessed 171 of the 575 lakes and reservoirs assigned recreation and/or warmwater or coldwater fish life beneficial uses. The assessed lakes account for 67% of the total classified lake acreage. An estimated 15.7% of the assessed lake acreage was considered to support all assigned beneficial uses. Sixty-one lakes do not support water quality standards for the assigned uses but have approved TMDLs. Sixty-two lakes do not support water quality standards for the assigned uses and are on the 303(d) impaired waterbodies list and require TMDL development.

The low number of lakes and reservoirs meeting all assigned beneficial uses can be attributed in large part to mercury in fish tissue. Prior to the 2016 reporting cycle, only 18 lakes were considered not supporting for mercury based on a fish consumption advisory. In 2016, DENR adopted EPA's mercury in fish tissue standard of 0.3 mg/kg. As a result, nearly all lakes sampled for mercury in fish tissue were deemed not supporting aquatic life propagation uses.

DENR received final EPA approval for a statewide mercury TMDL, which included 75 waters not supporting mercury in fish tissue. The TMDL documented that the primary source of mercury in South Dakota comes from global atmospheric deposition. Therefore, the low incidence of nonsupport for lakes is not likely to improve until measures to reduce mercury are implemented at a global scale.

Another main cause of nonsupport continues to be excessive algae (blooms) due to nutrient enrichment from watershed scale nonpoint sources and internal loading.

Many lakes and reservoirs meet water quality standards associated with designated uses. Seventy percent of lake acres assessed were considered to fully support the limited contact and immersion recreation uses. In addition, 100% of the assessed lake acreage complied with bacteria standards in accordance with the listing methodology. The majority of lake acreage assessed for warmwater and coldwater fish life uses also complied with water quality standards. Over 70% of the assessed lake acreage complied with standards for specific conductance, pH, dissolved oxygen, water temperature and total dissolved solids. In addition, 100% of the lakes acres assessed for total suspended solids, nitrates, total ammonia, and total alkalinity complied with standards for warmwater and coldwater beneficial uses in accordance with the listing methodology.

Table 1: Atlas

State Population 2010 Census	814,180
State Surface Area (sq. mi.)	77,047
Number of water basins (according to state subdivision)	14
Total number of river/stream miles	98,009*
Number of perennial river miles (subset)	9,726*
Number of intermittent stream miles (subset)	87,780*
Number of border river miles of shared river/streams (subset)	337*
Miles of ditches and canals (man-made waterways)	503*
Number of classified lakes/reservoirs/ponds	575
Acres of classified lakes/reservoirs/ponds	213,265
Acres of freshwater wetlands	1,870,790**
Name of border rivers: Missouri River, Big Sioux River, Bois de Sioux River.	

* Estimated from the National Hydrography Dataset (1:100,000 scale)
** National Wetlands Inventory

South Dakota has an estimated 1.87 million acres of wetland habitats according to the latest National Wetland Inventory study (Dahl, 2014). The total number of wetlands in South Dakota declined 2.8% from 1997 to 2009 (Dahl, 2014). Small temporary wetlands comprised the primary type of emergent wetland loss. South Dakota exhibited gains in all other emergent wetland classes, especially larger seasonal and semi-permanent classes between 1997 and 2009. The overall wetland area in South Dakota increased from the early to middle 1990s to 2009 (Johnson and Higgins, 1997 and Dahl, 2014).

Water Pollution Control Programs

The water quality goals of the state are to: identify water quality problems, set forth effective management programs for water pollution control, alleviate water quality problems, and achieve and preserve water quality for all intended uses.

Point Source Pollution Control (Surface Water Discharge System):
DENR continues to administer the National Pollutant Discharge Elimination System (NPDES) program in South Dakota, referred to as the Surface Water Discharge permitting program. The Surface Water Quality Program issues Surface Water Discharge permits and develops water quality-based effluent limits for point sources of pollution to ensure water quality standards are maintained.

Nonpoint Source Pollution Control
Nonpoint Source (NPS) pollution originates from diverse and diffuse sources. Nonpoint pollution controls must reflect this by wisely using resources available from various state, federal, and local organizations, plus landowner support and participation. South Dakota primarily uses voluntary measures for the implementation of Best Management Practices (BMPs) to control NPS pollution. The CWA Section 319 program is the focal point for a majority of the existing NPS control programs. For more than 25 years, the 319 program has been developing and implementing watershed restoration projects throughout the state.

Public information and education efforts have increased awareness of NPS pollution issues. State and federal programs provide technical assistance and financial incentives to landowners to address NPS pollution problems. Landowners have the capability to accomplish much if they understand the

problems and the methods to solve them. Many of the solutions involve land management changes that benefit the landowner by making their lands more productive and sustainable.

Bordering State's 303(d) and 305(b) Lists

North Dakota, Minnesota, Iowa, Nebraska, Wyoming, and Montana possess interstate or border waterbodies that are shared with South Dakota. Under the authority of the CWA, states are granted the right to prevent, reduce, and eliminate pollution, and to plan the development and use of land and water resources. Under this right, states may adopt federal water quality regulations or promulgate their own. States that promulgate their own water quality standards, at minimum, must be as stringent as federal standards. States that border South Dakota often have differences in water quality criteria and/or waterbody beneficial use designations. Due to these possible differences, 305(b) and 303(d) list support determination may differ on waterbodies that border South Dakota and another state. For more specific information on an interstate or border waterbody, interested parties should contact each state.

Comparison of Beneficial Use Support between Integrated Reporting Cycles

South Dakota's Integrated Report describes the percentage of stream miles that support beneficial uses. This general statistic is intended to characterize use support for a given reporting cycle and does not provide for a balanced comparison or trend analysis between reporting cycles. The number of stream miles assessed changes between reporting cycles (i.e. 2016-2018), assessment methodologies evolve, and datasets can change considerably. In addition, new assessment units are continually being added and removed between reporting cycles. Due to these factors, it is not possible to determine trends between reporting cycles as the appearance of a trend may have nothing to do with changes in water quality.

III. SURFACE WATER QUALITY ASSESSMENT

SURFACE WATER QUALITY MONITORING

General Discussion

South Dakota DENR monitors surface waters in the state through an established ambient water quality monitoring program, water quality surveys, fish surveys, TMDL assessments, Surface Water Discharge permits, and state nonpoint source implementation projects. The USGS also conducts routine monitoring throughout the state and that data is available on their website. DENR maintains an internal water quality database (NR92) and submits water quality data through EPA's Water Quality Exchange to EPA's data storage and retrieval (STORET) system.

Water quality standards were first established for all surface waters by the state's Committee on Water Pollution in 1967. The Water Management Board completed the final steps of its most recent triennial review and revisions on December 3, 2014. The Interim Legislative Rules Review Committee approved these revisions on December 16, 2014. DENR received EPA approval on June 17, 2016. On December 9, 2015, another hearing was held to delete the fecal coliform criteria from the immersion and limited contact recreation uses and to add EPA's nonylphenol aquatic life criteria. Those changes were approved by EPA in 2017. The water quality standards consist of water quality criteria necessary to protect those beneficial uses and an antidegradation policy that protects existing uses and high quality waters.

DENR designates all surface waters in the state for one or more of the following beneficial uses:

(1) Domestic water supply waters;
(2) Coldwater permanent fish life propagation waters;
(3) Coldwater marginal fish life propagation waters;
(4) Warmwater permanent fish life propagation waters;
(5) Warmwater semipermanent fish life propagation waters;
(6) Warmwater marginal fish life propagation waters;
(7) Immersion recreation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters;
(10) Irrigation waters; and
(11) Commerce and industry waters.

All streams in South Dakota are assigned the beneficial uses (9) and (10) unless otherwise stated in the Administrative Rules of South Dakota (ARSD) Chapter 74:51:03. Lakes listed in ARSD Chapter 74:51:02 are assigned the beneficial uses of (7), (8), and (9) unless otherwise specified.

ARSD Chapter 74:51:01 Surface Water Quality Standards is available at http://www.sdlegislature.gov/Rules/DisplayRule.aspx?Rule=74:51:01.

State toxic pollutant standards for human health and aquatic life are available at http://www.sdlegislature.gov/Rules/DisplayRule.aspx?Rule=74:51:01:55 and http://www.sdlegislature.gov/Rules/DisplayRule.aspx?Rule=74:51:01:0B.

Site specific standards are available in ARSD Chapters 74:51:01:45.01, 74:51:01:46.01, 74:51:01:48.01, 74:51:01:48.02, 74:51:01:53.01, and 74:51:01:56.

Watershed Protection Program

DENR's Watershed Protection Program's approach to NPS pollution is to identify and target sources of pollution and determine alternative restoration methods. The second phase is to control the sources of pollution and restore the quality of impacted waterbodies. Most phases of the program are state and local efforts with supplemental technical and financial assistance from EPA and other federal agencies.

The watershed assessment phase encompasses a series of procedures to assess the current condition of impaired waterbodies. Included in this phase are water quality, water quantity, and watershed data collection. The state provides a local sponsor with technical assistance, training and equipment to conduct a watershed assessment. Generally, the local project sponsor is responsible for collecting field data using federal funding, state grant funding, and existing local resources. Following the assessment, the state prepares a report which details baseline information including sources of pollution, pollution control alternatives and implementation costs. A TMDL is then developed using this information. The second phase provides an option for the sponsor to develop a watershed/lake restoration plan based on recommendations from the assessment. Technical assistance for this process is provided by DENR. If the plan is approved, the project sponsors are eligible to apply for appropriate state and federal funding to support a watershed restoration project.

The watershed assessment project is also designed to provide recommendations for in-lake restoration alternatives. The primary recommendations provided for lake restoration include, but are not limited to, natural flushing, reducing or eliminating sources of pollution, in-lake alum treatments, and shoreline stabilization. Restoration methods employed in the past include aeration, sediment removal, weed harvesting, and chemical weed control.

A list of watershed assessment and implementation projects conducted in South Dakota can be found on DENR's website: http://denr.sd.gov/dfta/wp/tmdl.aspx.

Lake management in South Dakota is dependent upon many resource management programs and agencies. The South Dakota Department of Agriculture, the NRCS, South Dakota Game, Fish, and Parks (GF&P), DENR, and many local agencies and special purpose districts are all crucial to the protection or restoration of lakes in the state. Local and county land use zoning ordinances exist in South Dakota and are considered local responsibilities.

NPS success stories in South Dakota can be found at the following EPA website: https://www.epa.gov/nps/nonpoint-source-success-stories.

Fixed Station Ambient Monitoring

The DENR water quality monitoring network is currently made up of 153 stations located on various rivers and creeks within the state. Sampling stations are located within high quality beneficial use classifications, above and below municipal/industrial discharges, or within watersheds of concern. Currently, the department collects these samples on a monthly, quarterly, or seasonal basis. This data collected is invaluable for evaluating historical water quality, establishing natural background conditions, and monitoring possible runoff events, and acute or chronic water quality problems.

The most commonly sampled parameters include *E. coli*, TSS, total dissolved solids, pH, ammonia, nitrates, dissolved oxygen, water temperature, pH, specific conductance, and total phosphorous. Several stations are sampled for sodium, calcium, and magnesium during the irrigation season. Stations located along streams that receive flows from historic Black Hills mining areas are also analyzed for cyanide, cadmium, lead, copper, zinc, chromium, mercury, nickel, selenium, silver, and arsenic. Stations along streams that receive flows from historic uranium mining or current exploration are analyzed for arsenic, barium, molybdenum, uranium, radium 226, and radium 228.

Ambient station locations, descriptions, and schedules are available online at http://denr.sd.gov/des/sw/wqmonitoring.aspx or from DENR upon request.

Intensive Water Quality Monitoring (Point Sources or Special Studies)

Some of South Dakota's wastewater treatment facilities are required to meet limits beyond the federal technology-based effluent limits. For many of these permits, DENR conducts an intensive water quality survey of the waterbody receiving the discharge. These surveys provide additional information to assist in the development of water quality-based effluent limits for the Surface Water Discharge permits. Point source special studies have recently been conducted on Moccasin Creek, Spring Creek, and the Redwater River. Information is being used in the development of Surface Water Discharge permits for the cities of Spearfish, Aberdeen, and Warner.

Intensive water quality monitoring may also be initiated to investigate and identify quality control issues, collect data for use in compliance, enforcement, or site-specific criteria development, or to provide updated information for a waterbody.

Use Attainability Analysis

DENR conducts a Use Attainability Analysis (UAA) on waterbodies assigned the highest beneficial use designation (9) Fish and wildlife propagation, recreation, and stock watering waters that receive or are proposed to receive a permitted surface water discharge under the Surface Water Discharge Permitting Program. DENR may also conduct a UAA under certain circumstances to determine if the waterbody is assigned the appropriate beneficial uses. During the UAA, physical characteristics of the stream and

surrounding land use are documented, physical and chemical properties of the surface water are analyzed, and fish species presence/absence determinations are made. The waterbody reach is visited various times to include different seasons and years. Based on the information collected, the existing beneficial use designation may remain or be assigned a more appropriate beneficial use designation.

Recreation Use Study

During the summer months of 2008 through 2017, DENR has been assessing and will continue to assess the recreation beneficial use of waters that are assigned the (8) Limited contact recreation waters beneficial use. The purpose of the study is to determine if the existing beneficial use is appropriate or if the waterbody should also be assigned the (7) Immersion recreation waters beneficial use. During the study, field personnel measure channel depth and width, stream flow, dissolved oxygen, and pH. Surface water quality samples are collected and analyzed for *E. coli* bacteria. In addition, public access, land use, channel morphology, and other physical characteristics of the waterbody are documented and photographed. Area residents are interviewed and asked questions regarding stream flow and recreational use in the waterbody.

General Biological Monitoring and Assessment

Biological samples are often included as part of a use attainability assessment, watershed assessment study or special project. DENR's Watershed Protection Program incorporates aquatic plant/algae surveys and chlorophyll-*a* testing into lake studies. Stream studies incorporate bioassessment surveys using fish, aquatic macroinvertebrates, periphyton and mussels as biological indicators of water quality.

Perennial-Wadeable Stream Bioassessment

DENR and research partners from SDSU identified stream reference sites and developed bioassessment tools for perennial wadeable streams in the Northern Glaciated Plains (NGP) ecoregion of eastern South Dakota (map in Appendix E). The project focused on reference site validation, Index of Biological Integrity (IBI) development, and generation of a biomonitoring toolkit to increase the state's biological monitoring and assessment capacity. Final deliverables of the project included identification of validated reference sites, core metrics and an IBI process-quantification tool. The project also yielded biological, habitat and water quality datasets, Kriging (IBI interpolation tool) maps, habitat entry and analysis templates, two Master of Science theses, and several peer-reviewed journal publications. Results of this effort will be used for a variety of water resource management applications including evaluating nutrient-related narrative standards. Future work is being focused on expanding the reference site network and gaining existing reference site data.

DENR and research partners from SDSU expanded reference site development and bioassessment efforts to the Northwestern Great Plains ecoregion in western South Dakota (map in Appendix E). The project began in 2013 and commenced in the fall of 2017. The project was based on a random probabilistic survey design stratified by level 4 ecoregions. Final project deliverables were similar to those produced in the aforementioned NGP ecoregion. Results of this effort are expected to be used for a variety of water resource management applications including evaluating nutrient-related narrative standards for the 2020 reporting cycle. Future work will be focused on expanding the reference site network and gaining existing reference site data.

Intermittent Stream Bioassessment

A large majority of the stream miles (90%) in South Dakota are characterized as intermittent. These streams were once thought to be less significant than perennial streams due to the lack of constant flow. Intermittent streams have gained recognition nationwide with respect to their ecological importance as many contribute greatly to downstream water quality, habitat condition, and biotic integrity.

DENR was awarded an EPA R-EMAP research grant (2006-2010) to develop a reference site network for intermittent streams in the NGP ecoregion of eastern South Dakota (map in Appendix E). The intermittent stream reference site project was conducted through a collaborative effort between DENR and the principal investigator Dr. Nels H. Troelstrup, Jr. from the Natural Resource Management Department at SDSU. The project provided the state with the tools necessary to identify "reference quality" stream reaches, and the framework for developing bioassessment tools required to make determinations about habitat and biotic integrity of potentially impacted streams. Aquatic macroinvertebrates (bugs) represented the primary biological indicator for determining health of these systems. The project provided a habitat and macroinvertebrate sampling protocol and further insight into macroinvertebrate community characteristics (index period) of intermittent streams. Final deliverables associated with the intermittent stream reference site project included a detailed project summary, two Master of Science theses, and several peer-reviewed publications.

Biological Reference Collection and Database

DENR and GF&P are providing financial and technical support for the development of a statewide biological reference collection and database. Support and maintenance of the collection and database is being provided by research personnel from the Natural Resource Management Department at SDSU. Aquatic macroinvertebrate and mussel voucher specimens from statewide collection efforts are being processed and stored at various campus facilities. All information associated with each individual specimen including geo location is being documented in the SPECIFY database developed and maintained by the National Science Foundation. South Dakota GF&P in conjunction with SDSU recently conducted a statewide stream mussel survey. Voucher specimens and supporting information were added to the collection and database. Similar surveys are planned for fish and macroinvertebrates. Stream site locations selected for this survey work are based on areas of the state considered to be poorly represented according to site distributions identified in SPECIFY. The long term goal of the project is to make biological information available to a variety of users.

Fish Contaminants Sampling

In a collaborative effort among GF&P, the Department of Health, and the DENR, fish tissue from lakes and rivers are sampled and analyzed for contaminants including mercury, cadmium, selenium, pesticides, and PCBs. The data are used to monitor and assess the levels of these contaminants present in fish flesh.

The sampling locations and schedule are determined in a joint effort by GF&P and DENR personnel. The rivers and lakes are typically sampled in conjunction with GF&Ps' survey sampling and occur between early spring and late fall. Waterbodies are selected based on GF&P fishery management objectives, public access, and fishing pressure. Waterbodies are resampled based on contaminant concentrations in fish tissue.

The data is used by both the Department of Health and DENR. The Department of Health will issue a fish consumption advisory when sampling results indicate the one part per million Food and Drug Administration mercury threshold may be exceeded in edible fish tissue. DENR also uses mercury in fish tissue results to assess the mercury in fish tissue water quality criterion (0.3mg/kg) and determine waterbody support. Fish tissue sampling design and procedures are addressed in the SWQP document *South Dakota Fish Contaminants Sampling Protocol*, January 2013.

Lake Survey Design

DENR uses a Generalized Random Tessellation Stratified lake survey design. This sampling design allows DENR to select a subset of the most important water resources in the state, while the random component provides statistically valid results to make general determinations about the entire target

population. The target population for the 2016-2017 survey included all lakes designated coldwater and warmwater fish life beneficial uses (575 waterbodies). Three waterbodies deemed publicly important were also sampled. Seventy classified lakes were randomly selected and sampled during the 2016-2017 field season. Additional information pertaining to the probabilistic sampling design and results from the 2016-2017 survey is documented in the Statewide Surface Water Quality Summary section.

Toxicity Testing Program

Priority toxic pollutants are expensive to analyze and are not routinely monitored except for special situations. Whole effluent toxicity tests are included as permit limits in some municipal and industrial Surface Water Discharge permits.

Total Maximum Daily Loads (TMDLs) and Section 303(d)

Overview of TMDLs

TMDLs are an important tool for the management and protection of South Dakota's surface water quality. The goal of TMDLs is to ensure that waters of the state attain and maintain water quality standards to ensure support of designated beneficial uses. EPA defines a TMDL as "the sum of the individual waste load allocations for point sources and load allocations for both nonpoint sources and natural background sources established at a level necessary to achieve compliance with applicable surface water quality standards." In simple terms, a TMDL is the amount of pollution a waterbody can receive and still support its designated beneficial uses. TMDLs must be developed for impaired waters, should address a specific waterbody or watershed, and should specify quantifiable targets and associated actions that will enable the waterbody to support its designated beneficial uses.

Section 303(d) of the CWA requires states to develop and submit a biennial list of impaired waters targeted for TMDL development, referred to as the 303(d) list. Pollutant causes, TMDL priority, and a schedule for TMDL development is required. TMDLs must allow for seasonal variations and provide a margin of safety to account for uncertainty. Appendix A provides a list of waterbodies with EPA approved TMDLs.

Types of Waters Listed

The following information and data sources were used to determine which waterbodies require TMDLs based on the requirements of section 303(d) of the CWA:

- Waters included in the Integrated Report that are identified as "not supporting" or also known as "impaired" waters;
- Waters for which modeling indicates nonattainment of water quality standards; and
- Waters for which documented water quality problems have been reported by local, state, or federal agencies, the general public, or academic institutions.

Appendix D provides a summary of DENR's 2018 303(d) list.

Impaired Waters

Waterbodies that are identified as "NON" (nonsupporting) under the "Support" column in the basin tables are placed in EPA Category 5 which identifies the waterbody as impaired and requires a TMDL. This is the basis for the 303(d) list. If a waterbody is identified as "NON" but has an approved TMDL for the pollutant cause the waterbody is placed in EPA Category 4a (nonsupporting with a TMDL).

Waters with Surface Water Discharge-Related Wasteload Allocations

In 1993, DENR was delegated the authority to administer the National Pollutant Discharge Elimination System (NPDES) permitting program. As stated earlier, South Dakota's NPDES permitting program is referred to as the Surface Water Discharge (SWD) permitting program. SWD permits are used to control the discharge of pollutants from point sources. At a minimum, most SWD permits contain technology-based effluent limits, which are attained using the best available technology that is

economically achievable. However, in some cases the application of technology-based effluent limits is not sufficient to ensure the surface water quality standards are maintained. For these permits, DENR develops water quality-based effluent limits for the permit.

If a SWD permittee discharges a pollutant to an impaired waterbody, the TMDL for that pollutant will include a "wasteload allocation" for the permittee. The wasteload allocation is implemented through the SWD permit.

SWD permits are issued for a maximum of five years, after which time the effluent limits and existing in-stream water quality are reevaluated. Ammonia, biochemical oxygen demand (BOD), and dissolved oxygen are the primary parameters targeted for modeling to develop water quality-based effluent limits.

Waters Reported by Government Agencies, Members of the General Public, or Academic Institutions
DENR did not receive recommendations to list specific water resources on the 2018 303(d) list from outside government agencies, members of the general public, environmental organizations, or academic institutions.

TMDL Prioritization of 303(d) Listed Waters

EPA regulations codify and interpret the requirement in Section 303(d)(1)(A) of the CWA such that states establish a priority ranking for waters listed as impaired (or threatened) in their Integrated Reports. The regulations of 40 C.F.R. Part 130.7(b)(4) require states to prioritize waters in their Section 303(d) lists for TMDL development and to identify those water quality limited segments targeted for TMDL development in the next two years. States may consider other factors relevant to prioritizing waters for TMDL development, including programmatic needs such as wasteload allocations for permits, vulnerability of particular waters as aquatic habitats, recreational, economic, and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. DENR has a two-tiered priority scheme.

Priority 1

- Documented health problems or a threat to human health;
- Waters listed as impaired because of bacteria and TSS in waters assigned coldwater fisheries, or mercury in fish flesh;
- Waters where TMDL development is expected during the next two years; or
- Waters with documented local support for water quality improvement.

Priority 2

- Water where local support for TMDL development is expected but not documented;
- Waters having impairments not listed as a Priority 1;
- Waters with no evident local support for water quality improvements; or
- Waters where impairments are believed to be due to largely to natural causes.

For more information on nonpoint source TMDL development and implementation refer to the "South Dakota Nonpoint Source Program Management Plan." This document is located at the following website: http://denr.sd.gov/dfta/wp/documents/NPSMgmtPlan14.pdf.

SOUTH DAKOTA'S LONG-TERM VISION STRATEGY

Section 303(d) of the CWA provides for an opportunity to more effectively restore and protect South Dakota's waters by using a systematic process of prioritizing TMDL development and implementing alternative approaches and protection activities. A Long-Term Vision (hereafter referred to as the Vision) was developed by the EPA and six actions were identified as being important to this process. South Dakota's strategy includes the six actions discussed below.

Engagement

The Vision for the CWA 303(d) Program asks EPA and the states to actively engage the public and other stakeholders to improve and protect water quality, as demonstrated by documented, inclusive, transparent, and consistent communication; requesting and sharing feedback on proposed approaches; and enhanced understanding of program objectives.

South Dakota uses multiple means to engage the public and stakeholders and these will be used as part of the Vision. The Nonpoint Source Task Force will be a primary means of getting information about the Vision to the stakeholders. The NPS Task Force is a citizen's advisory group containing approximately twenty-five agencies, organizations, and tribal representatives. The NPS Task Force meetings are open to the general public. The NPS Task Force provides a forum for the exchange of information and activities about NPS related activities as well as providing recommendations for projects applying for CWA Section 319 funds. A presentation about the Vision was given by DENR to the NPS Task Force on December 9, 2014. The EPA also participated in the meeting and responded to questions during the presentation. There was much discussion of the Vision, the TMDL Prioritization Scheme, and how the Vision would impact NPS Implementation Projects. A presentation was also given during the NPS Coordinators meeting on April 22, 2015. Additional presentations about the Vision will occur as needed.

A September 2015 EPA/State joint Nonpoint Source Pollution and Water Quality Meeting was held in Rapid City, South Dakota and brought together the states in EPA Region 8 as well as other regional interests. The Vision plans for each state were presented and each state responded to questions/comments about their Vision plan.

The public notice process used to announce the availability of the Integrated Report is the primary forum used to engage the public regarding the Vision. The public notice process allows the public and stakeholders the opportunity to formally comment on contents of the IR and the Vision. Additional efforts to inform the public and stakeholders about the Vision will occur in response to requests by stakeholders and the public.

Some elements of the Vision, such as Alternative or Protection activities, may be incorporated into NPS Implementation projects. If these projects request CWA Section 319 funds, these projects will be presented to the NPS Task Force as well as the South Dakota Board of Water and Natural Resources for review and approval of funding. This provides additional opportunities for public comment. The Vision will also be included in the South Dakota NPS Management Plan.

Prioritization

The Vision prioritization process used is a subset of the TMDL prioritization of 303(d) listed waters (described on page 17).

The original Vision priority waters were those not supporting their designated beneficial uses for bacteria, TSS, chlorophyll-*a*, temperature (in waters assigned coldwater fisheries), or mercury in fish tissue. However, changes in the impairment status, and other considerations required a decrease in the numbers of Vision priority waters. These changes are shown in South Dakota's Vision priority waters list in Table 2. Ten lakes were removed from the list because a chlorophyll-*a* threshold has not

been determined and the TMDLs cannot be completed without that threshold. Nine stream segments were removed because their status changed from being impaired to meeting their uses. Another three waterbodies were removed because it was determined that more data were needed before those TMDLs could be written.

Protection

This element is intended to encourage management actions that prevent impairments to waters not currently impaired. South Dakota is receptive to this concept and will consider providing technical or financial assistance to these types of projects. There is no anticipation of a large number of requests for "protection" activities and DENR will consider each as they become known. Requests for funding for CWA Section 319 funds will follow the same protocols as other projects requesting these funds and the "protection" activities must be identified as such. Protection activities within an existing implementation project must also identify those activities as "protection" activities.

Integration

DENR has very good working relationships with other programs, and regional, state and federal agencies. The NPS Task Force is a major forum for interaction between the various federal, state, regional, and local agencies as well as the general public. The Natural Resources Conservation Service (NRCS) is the primary federal agency that DENR interacts with on NPS implementation projects. CWA Section 319 funds are often used in concert with NRCS funds to more efficiently use both funding sources to combat NPS pollution. The U.S. Forest Service, USBOR, or Bureau of Land Management may also be involved in DENR's NPS control effort if activities will occur or impact lands managed by these agencies. In addition, the USGS provides much needed data about water flow and water quality in certain rivers and streams in South Dakota and has been a partner in various water quality assessment activities.

Regional or local agencies are often project sponsors for NPS assessment or implementation projects. Water development districts, conservation districts, cities, and locally-based partnerships have all interacted with DENR and have integrated into NPS assessment and implementation projects. Universities have been involved in South Dakota's NPS control effort through research studies that help the state assess water or biological quality of our streams (e.g. the Intermittent Stream Study or the Northern Great Plains Reference Site Development Project). It is anticipated that this effort will expand to include a Northwestern Great Plains Reference Site Development Project.

Alternatives

Alternative approaches that incorporate adaptive management or are tailored to specific circumstances where such approaches are better suited to implement priority watershed or water actions to restoration may be used in addition to TMDLs. Generally, DENR currently requires a TMDL to be developed before funds are allocated towards a NPS 319 Implementation Project. Henceforth, consideration will be given to projects or cases where a relatively simple or straight-forward solution can be reached without going through the TMDL development process. Requests for funding for CWA Section 319 funds will follow the same protocols as other projects requesting these funds and the "alternative" activities must be identified as such. DENR also supports an Information and Education Program that may be useful in circumstances where public outreach and education can help to identify alternative approaches to resolving water quality issues.

Assessment

The goal of this element is to identify the extent of healthy and CWA Section 303(d) impaired waters in each State's priority watersheds or waters through site-specific assessments. South Dakota uses a number of methods and data sources to assess waters included in the Vision and they are highlighted below.

- Fixed ambient monitoring of rivers and streams. The major rivers in the state are sampled and analyzed for a select suite of parameters;
- Data are also obtained from regional sources or federal agencies (e.g. the USGS or the volunteer lake monitoring program);
- Lakes are sampled as part of a statistically-based Statewide Lakes Assessment (SWLA) each year. A minimum of 50 lakes are randomly selected and sampled for a standard suite of parameters;
- Intensive water monitoring is sometimes conducted to assess specific point or nonpoint source problems;
- Site-specific assessments are often used during TMDL studies if more general data methods/surveys do not provide adequate data. NPS implementation projects may also use site-specific studies to document water quality improvements due to NPS implementation project activities.

South Dakota's Vision and its list of waters needing TMDLs are primarily based on data gathered (listed in the first three bullets above). Stream data are usually available for the major streams but other streams may not have any data. Lakes are sampled randomly as part of the SWLA, so individual lakes may or may not have enough data to develop a TMDL. Intensive monitoring and site-specific assessments are initiated when data are lacking for a particular waterbody or if specific information is needed when cause/effect relationships are sought. A number of waterbodies were dropped from the Vision because sufficient data were lacking to develop those TMDLs. Additional sampling for those waterbodies will be done as resources allow.

In addition, DENR is working with EPA to develop scientifically defensible thresholds for chlorophyll-*a* and/or nutrients (nitrogen and phosphorus) in lakes. Thresholds for lakes in ecoregions 17 and 43 will be developed first and thresholds for lakes in the remaining ecoregions will be completed at a later date. Numeric targets for nutrients in streams may also be developed in the future. Ten lakes were on the original Vision priority list but these were dropped because DENR and EPA have not agreed upon a chlorophyll-*a* threshold and some of the lakes were in need of additional sampling because the original data sets were more than ten years old.

South Dakota has a well-documented history of doing site-specific assessments and will continue to develop and schedule assessment projects where data are deemed lacking for waters needing a TMDL. Site-specific assessments are either done by DENR personnel if the waterbody is within reasonable travel distance or by a regional entity/contractor if funds are available and direct DENR involvement is not the best option. Computer modelling, scientific literature, and reference conditions may also be used to assess waters.

Vision Summary

The South Dakota strategy for the Long-Term Vision under the CWA Section 303(d) Program contains the six elements stressed by EPA. The primary goal is to prioritize TMDL development for the Vision where implementation activities can be focused to provide a better chance of improving water quality. However, much time, effort, and funds have been spent assessing and working on other TMDLs, so those TMDLs will also be considered and prioritized as part of South Dakota's broader TMDL development effort. The revised Vision documents entitled "South Dakota Clean Water Act Section 303(d) Program Long-Term Vision -February 2018" can be accessed at the following address: http://denr.sd.gov/dfta/wp/tmdl/tmdlvision.pdf.

Table 2: South Dakota Vision Priority Waters

Assessment Unit ID	Assessment Unit Name	Cause Name	Status
SD-BA-L-WAGGONER_01	Waggoner Lake	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-BF-L-NEWELL_01	Newell Lake	Mercury In Fish Tissue	Retained
SD-BF-R-BEAR_BUTTE_01	Bear Butte Creek	Temperature	Dropped - meeting its uses
SD-BF-R-BEAR_BUTTE_02	Bear Butte Creek	Temperature	Dropped - meeting its uses
SD-BF-R-BELLE_FOURCHE_01	Belle Fourche River	*Escherichia Coli*	Retained
SD-BF-R-DEADWOOD_01	Deadwood Creek	*Escherichia Coli*	Retained
SD-BF-R-WHITEWOOD_01	Whitewood Creek	Temperature	Dropped - meeting its uses
SD-BF-R-WHITEWOOD_04	Whitewood Creek	*Escherichia Coli*	Retained
SD-BF-R-WHITEWOOD_06	Whitewood Creek	*Escherichia Coli*	Retained
SD-BS-L-BITTER_01	Bitter Lake	Mercury In Fish Tissue	Retained
SD-BS-L-BULLHEAD_01	Bullhead Lake	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-BS-L-ISLAND_N_01	North Island Lake	Mercury In Fish Tissue	Retained
SD-BS-L-LONG_COD_01	Long Lake	Mercury In Fish Tissue	Retained
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Mercury In Fish Tissue	Retained
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-BS-L-REID_01	Reid Lake	Mercury In Fish Tissue	Retained
SD-BS-L-SWAN_01	Swan Lake	Mercury In Fish Tissue	Retained
SD-BS-L-TWIN_01	Twin Lakes/W. Hwy 81	Mercury In Fish Tissue	Retained
SD-BS-L-TWIN_02	Twin Lakes	Mercury In Fish Tissue	Retained
SD-BS-R-BEAVER_02	Beaver Creek	*Escherichia Coli*	Retained
SD-BS-R-BIG_SIOUX_01	Big Sioux River	*Escherichia Coli*	Retained
SD-BS-R-BIG_SIOUX_05	Big Sioux River	Total Suspended Solids	Retained
SD-BS-R-BIG_SIOUX_06	Big Sioux River	Total Suspended Solids	Retained
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Total Suspended Solids	Retained
SD-BS-R-BIG_SIOUX_14	Big Sioux River	Total Suspended Solids	Retained
SD-BS-R-BRULE_01	Brule Creek	*Escherichia Coli*	Retained
SD-BS-R-BRULE_01	Brule Creek	Total Suspended Solids	Retained
SD-BS-R-EAST_BRULE_01	East Brule Creek	Total Suspended Solids	Retained
SD-BS-R-SIXMILE_01	Six Mile Creek	*Escherichia Coli*	Retained
SD-BS-R-SKUNK_01	Skunk Creek	*Escherichia Coli*	Retained
SD-BS-R-UNION_01	Union Creek	Total Suspended Solids	Dropped - needs more data
SD-CH-R-BATTLE_01_USGS	Battle Creek	Total Suspended Solids	Dropped - meeting its uses
SD-CH-R-BATTLE_02	Battle Creek	Temperature	Dropped - meeting its uses
SD-CH-R-CHEYENNE_02	Cheyenne River	*Escherichia Coli*	Dropped - needs more data
SD-CH-R-CHEYENNE_02	Cheyenne River	Total Suspended Solids	Dropped - evaluate TSS standard
SD-CH-R-GRACE_COOLIDGE_01	Grace Coolidge Creek	Temperature	Dropped - meeting its uses
SD-CH-R-GRIZZLY_BEAR_01_USGS	Grizzly Bear Creek	Temperature	Dropped - meeting its uses
SD-CH-R-RAPID_04	Rapid Creek	*Escherichia Coli*	Retained

Assessment Unit ID	Assessment Unit Name	Cause Name	Status
SD-CH-R-SPRING_01	Spring Creek	*Escherichia Coli*	Retained
SD-CH-R-SPRING_01	Spring Creek	Total Suspended Solids	Retained
SD-JA-L-BIERMAN_01	Bierman Dam	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-JA-L-CARTHAGE_01	Lake Carthage	Chlorophyll-*a*	Dropped
SD-JA-L-ELM_01	Elm Lake	Mercury In Fish Tissue	Retained
SD-JA-L-LARDY_01	Lardy Lake	Mercury In Fish Tissue	Retained
SD-JA-L-MID_LYNN_01	Middle Lynn Lake	Mercury In Fish Tissue	Retained
SD-JA-L-OPITZ_01	Opitz Lake	Mercury In Fish Tissue	Retained
SD-JA-L-ROSETTE_01	Rosette Lake	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-JA-L-TWIN_01	Twin Lakes	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-JA-R-FIRESTEEL_01	Firesteel Creek	*Escherichia Coli*	Dropped - needs more data
SD-JA-R-JAMES_08	James River	Total Suspended Solids	Retained
SD-JA-R-JAMES_09	James River	Total Suspended Solids	Retained
SD-JA-R-JAMES_10	James River	Total Suspended Solids	Retained
SD-JA-R-JAMES_11	James River	Total Suspended Solids	Retained
SD-JA-R-WOLF_01	Wolf Creek	*Escherichia Coli*	Retained
SD-JA-R-WOLF_02	Wolf Creek	*Escherichia Coli*	Retained
SD-MI-L-HURLEY_01	Lake Hurley	Mercury In Fish Tissue	Retained
SD-MI-L-POCASSE_01	Lake Pocasse	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-MI-L-ROOSEVELT_01	Roosevelt Lake	Mercury In Fish Tissue	Retained
SD-MN-R-WHETSTONE_S_FORK_01	South Fork Whetstone River	*Escherichia Coli*	Retained
SD-MN-R-WHETSTONE_S_FORK_02	South Fork Whetstone River	*Escherichia Coli*	Retained
SD-MN-R-YELLOW_BANK_N_FORK_01	North Fork Yellow Bank River	*Escherichia Coli*	Retained
SD-MN-R-YELLOW_BANK_S_FORK_01	South Fork Yellow Bank River	*Escherichia Coli*	Retained
SD-MU-L-COAL_SPRINGS_01	Coal Springs Reservoir	Mercury In Fish Tissue	Retained
SD-NI-L-RAHN_01	Rahn Lake	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-VM-L-THOMPSON_01	Lake Thompson	Chlorophyll-*a*	Dropped - lacks chlorophyll target
SD-VM-R-LONG_01	Long Creek	*Escherichia Coli*	Retained
SD-VM-R-VERMILLION_03	Vermillion River	*Escherichia Coli*	Retained
SD-VM-R-VERMILLION_E_FORK_01	East Fork Vermillion River	*Escherichia Coli*	Retained
SD-VM-R-VERMILLION_E_FORK_02	East Fork Vermillion River	*Escherichia Coli*	Dropped - meeting its uses
SD-VM-R-VERMILLION_WEST_FORK_01_USGS	West Fork Vermillion River	*Escherichia Coli*	Retained

Summary of the State TMDL Waterbodies

Using the methodologies, data, information, and public input described for the surface water quality assessments, DENR included the waterbodies that require TMDLs in Tables 20 – 33. These tables include waterbody names, pollutants of concern, and other information. A total of 152 different waterbodies require TMDLs. Each waterbody may contain several different pollutants and thereby may constitute several TMDLs. This results in 204 required TMDLs due to multiple impairment causes. In addition, some streams are listed more than once due to TMDLs identified for different segments of the same stream (even for the same pollutant). The 303(d) List of waterbodies that require TMDL development is available in Appendix D.

Resource Implications
TMDL issues span a wide range of activities within DENR. Nonpoint source assessments, clean lakes assessments, discharge permitting, storm water discharge permitting, erosion control, water quality monitoring, water quality standards, water rights, feedlot regulations, and other areas are involved in or affect TMDL development and implementation. Because of this, the development and implementation of TMDLs will rely on existing programs, resources, and activities. Effective TMDL development requires effective and continuous coordination within all DENR water programs. In addition, the development and implementation of effective TMDLs that will result in improving the quality of South Dakota's waters must have the support, input, and coordination of affected government agencies, local groups, and citizens. As such, the TMDL effort will involve the coordination of many diverse groups and the public with the common goal of improving water quality.

Delisting Reasons

Delisting of Waterbodies
Waters may be delisted using the following EPA delisting reasons:

- Applicable water quality standard attained, according to new assessment method;
- Applicable water quality standard attained, due to change in water quality standard;
- Applicable water quality standard attained, due to restoration activities;
- Applicable water quality standard attained, based on new data;
- Applicable water quality standard attained, original basis for listing was incorrect;
- Applicable water quality standard attained, reason for recovery unspecified;
- Applicable water quality standard attained, threatened water no longer threatened;
- Clarification of listing cause;
- Data and/or information lacking to determine water quality status, original basis for listing was incorrect;
- Listed water not in state's jurisdiction;
- Water determined to not be a water of the state; or
- Water quality standard no longer applicable.

Appendix B provides a list of waterbodies, causes, and delisting reasons used for the 2018 reporting cycle.

METHODOLOGY

Two major types of assessments were used to determine use support status of waterbodies: one based on monitoring, and the other based on qualitative evaluations. Monitoring data were primarily obtained from DENR, outside organizations, and DENR project sponsors.

DENR maintains a Quality Management System to ensure that all environmental water quality data generated or processed meet standard accepted requirements for precision, accuracy, completeness, representativeness, and comparability. This entails the preparation and periodic review and revision of the DENR Quality Management System, Quality Assurance Project Plans, and Standard Operating Procedures. It also includes the preparation of periodic reports to DENR management and EPA; the review of contracts, grants, agreements, etc., for consistency with quality assurance/quality control (QA/QC) requirements; and the administration of QA/QC systems and performance audits. This requires the establishment of schedules for the collection of duplicate and blank samples, laboratory split samples, review of field sampling techniques, and liaison with contracted labs to ensure compliance with QA/QC objectives.

DENR maintains an EPA-approved *Quality Management Plan* (Revision V, September 2016). The Surface Water Quality Program operates under the *Quality Assurance Project Plan for the Surface Water Quality Program and Feedlot Permit Program,* Revision VII, January 2016, and *Surface Water Quality Program and Feedlot Permit Program Standard Operating Procedures, Field Water Quality Sampling,* Revision III, January 2016. The Watershed Protection Program operates under the *Watershed Protection Program Quality Assurance Project Plan for the Assessment Team and Implementation Team,* Revision V, March 2016, *The Standard Operating Procedures for Field Samplers, Volume I (*revised September 2016) *& Volume II* (January 2017) can be accessed at http://denr.sd.gov/dfta/wp/wqinfo.aspx

DENR requires that all outside organizations that submit data or qualitative evaluations for this Integrated Report operate under a quality management system and be willing to provide quality assurance documentation upon request.

Rivers and streams were assessed by dividing waterbodies into segments that contain the same designated beneficial uses, water quality standards criteria, and environmental and physical influences. When section, township, and range are used in ARSD Chapter 74:51:03 to describe the beginning or end point of a stream segment, the boundary of the segment is that point where the most downstream portion of the stream crosses the boundary of that section. For lakes, the entire waterbody is assessed as a whole unit. The Hydrography Event Management Tool developed by USGS was used to create lakes and stream segments as part of the geospatial package. Lake acreage and stream miles were determined using medium resolution National Hydrography Dataset imagery. Monitoring data obtained during the current reporting period were analyzed by using DENR's NR92 Database system.

The data for each monitored waterbody were compared to numeric water quality standards applicable to the beneficial uses assigned to the segment and nutrient-related narrative standards.

Table 3: Criteria for Determining Support Status

Description	Minimum Sample Size	Impairment Determination Approach
FOR CONVENTIONAL PARAMETERS (such as dissolved oxygen, TSS, *E. coli* bacteria, pH, water temperature, etc.)	STREAMS: a minimum of 10 samples (collected on separate days) for any one parameter are required within a waterbody reach. A minimum of two chronic (calculated) results are required for chronic criteria (30-day averages and geomeans). LAKES: at least two independent years of sample data and at least two sampling events per year.	STREAMS: >10% exceedance for daily maximum criteria (or 3 or more exceedances between 10 and 19 samples) or >10% exceedance for chronic criteria (or 2 or more exceedances between 2 and 19 samples) LAKES: >10% exceedance when 20 or more samples were available. If < 20 samples were available, 3 exceedances were considered impaired. See lakes listing methodology section for specifics on parameters associated with a vertical profile (i.e., dissolved oxygen, water temperature, pH, and specific conductance).
FOR TOXIC PARAMETERS (such as metals, total ammonia, etc.)	All Lakes and Streams: Minimum of 2 samples within a consecutive 3 year period within the data age date range.	All Lakes and Streams: More than one exceedance of toxic criteria within a consecutive 3 year period (within the data age date range) for the acute and/or chronic standard.
FOR MERCURY IN FISH TISSUE	ALL Lakes and Streams: A minimum of 10 tissue samples are required. No minimum number of sample events. All available data from January 2007 through September 2017 was used.	ALL Lakes and Streams: 95th percentile of data exceeds 0.3mg/kg mercury OR when a fish consumption advisory has been issued.
DATA AGE (for both conventional and toxic parameters)	STREAMS: Data collected from October 1, 2012, to September 30, 2017 (unless otherwise noted) LAKES: All available data collected from January 2007 through September 2017 Although the reporting cycle spans two years, that data age does not allow for sufficient temporal variability. Therefore, the above data ages will be used unless there is justification that the data are not representative of current conditions.	

Assessment Methodology for Numeric Water Quality Standards

Table 3 outlines data age and the required number of samples used by DENR to determine waterbody support. Deviations from the above criteria were allowed in specific cases and are generally discussed in the proceeding tables listing the surface water quality summaries. Use support assessment for all assigned uses was based on the number of exceedances of water quality standards for the following parameters: TSS, total dissolved solids, pH, water temperature, dissolved oxygen, *E. coli*, and others. Exceedances of more than one parameter were not considered additive in determining overall support status for any given waterbody. A waterbody with less than 10% exceedances with respect to the total number of samples for one or more parameters is considered fully supporting. However, toxic parameters are only allowed one violation in a three-year period to be considered fully supporting. The weekly average temperature is calculated on a rolling seven-day period. Chronic standards, including geometric means and 30-day averages, are applied to a calendar month. For hardness-based metals, the hardness and metal concentrations were averaged for the calendar month. For mercury in fish tissue, the reach is considered nonsupporting if the 95th percentile of the cumulative mercury fish tissue concentration exceeds the water quality criterion or if the state has issued a mercury fish consumption advisory.

To ensure a sufficient number of samples were available for each stream segment (usually a minimum of 10) the period of record considered for this report was from October 1, 2012, to September 30, 2017, (5 years unless otherwise noted) for streams, and January 1, 2007, to September 30, 2017, (10 years) for lakes. The ten-year timeframe in lakes was designated to account for climatic variability (wet and dry cycles) and increase the chance of covering multiple sampling events. The ten-year timeframe was thought to provide a more recent description of a lake's support status between reporting cycles in comparison to using all available data.

In addition to the stream and lake listing methodologies, waterbodies were also evaluated based on reported beach closures, fish kills, fish consumption advisories, applicable public complaints, and best professional judgment.

Stream Assessment Methodology for Nutrient-Related Narrative Standards

EPA considers nutrient pollution of the nation's waters a top priority. The agency is calling upon states to increase efforts to address nutrient pollution. Item #3 in EPA's 2014 Integrated Report Memo to States, describes considerations for "Identifying nutrient-impacted waters for the Section 303(d) list for states without formal numeric nutrient water quality criteria." This section identifies potential approaches for developing nutrient-related criteria to address applicable narrative standards to make beneficial use support determinations and impairment decisions. If states fail to evaluate existing and readily available data and information relevant to applicable narrative criteria and designated uses, EPA "will take appropriate actions consistent with the Clean Water Act." EPA's 2016 Integrated Report Memo reiterates the need for states to continue to identify waters impacted by nutrients for the Section 303(d) list.

South Dakota has a number of narrative water quality standards in ARSD Chapters (74:51:01:05, 74:51:01:06, 74:51:01:08, 74:51:01:09, 74:51:01:10, and 74:51:01:12) designed to protect surface waters from nutrient-related impacts. DENR developed a decision tree based assessment method using multiple lines of evidence to evaluate potential nutrient impairment in streams based on applicable nutrient-related narrative standards (Table 4).

The assessment method is structured to identify streams which exceed regional reference based nutrient (nitrogen and phosphorus) thresholds as an initial screening mechanism. Further evaluation of those waters is conducted using measures of ecological integrity and associated thresholds to make final support decisions with regards to support of applicable beneficial uses.

Stream habitat and biological assessment tools were developed on a regional basis and are only applicable to the area where they were developed. As a result, the assessment methodology applies exclusively to wadeable-perennial, stream assessment units located in level III ecoregion 46, with the exception of those in level IV ecoregion 46c (Appendix E, Figure 1). In addition, this does not include the major mainstem rivers (exception, SD-BS-R-BIG_SIOUX_01) within level III ecoregion 46. Limitations associated with evaluating all assessment units statewide are based on the availability of regional and/or site-specific bioassessment tools.

Building bioassessment capacity at the statewide level is a long-term goal of DENR and its research partners from SDSU. Efforts are currently underway to develop bioassessment tools for wadeable streams in western South Dakota. As regional bioassessment tools become available, the assessment methodology will evolve to incorporate additional assessment units in subsequent reporting cycles.

Table 4: Assessment Methodology for Nutrient-Related Narrative Standards Applicable to Wadeable Streams in Ecoregion 46

Are there at least 20 total phosphorus-nitrogen sample results in the assessment unit?	No	End assessment
Yes		
Is the assessment unit located in Level III Ecoregion 46?	No	End Assessment
Yes		
Is the assessment unit located in Level IV Ecoregion 46c?	Yes	End Assessment
No		
Is the assessment unit considered wadeable?	No	End Assessment
Yes		
Is the average total phosphorous concentration above 0.18 mg/L or is the average total nitrogen concentration above 2.5 mg/L.	No	End Assessment
Yes		
Is an Invertebrate IBI and Fish IBI score calculated for the assessment unit?	No	Assign assessment unit to category 2N
Yes		
Are both IBI scores > 50? If one IBI score is <50 and one IBI score is >50, and a Habitat Condition Score is not available see special note: If two IBI scores (>50) and one Habitat Condition score is calculated: Are 2-of-3 scores meeting the impairment thresholds? Invert and Fish IBI score >50 Habitat Condition score >60	No	List as Impaired/Threatened Special Note: If one IBI score is > 50 and the other IBI score is <50 for then assign to category 2N. * Category 2N Implies the Assessment unit requires the necessary Invertebrate IBI, Fish IBI and Habitat Condition scores to make a final support/impairment determination. It also implies reassessment is necessary to make determination.
Yes	No	List as Impaired/Threatened
Assessment unit is not impaired.		

Figure 1: Location of Ecoregion 46 excluding 46c within South Dakota.

Total nitrogen and total phosphorus thresholds were not derived from data obtained during the NGP reference site and bioassessment project. Only seven (n=7) reference sites were validated across the region of which most were clustered in the Coteau des Prairies region of northeastern South Dakota. Poor reference site distribution and lack of reference site data (low replication) provided little statistical confidence to establish reference based nutrient thresholds. DENR plans to continue assessment efforts in ecoregion 46 in the future to build the reference site network and increase data replication.

DENR relied on results from EPA's National Wadeable Streams Assessment to establish total nitrogen and total phosphorus thresholds. The nitrogen (2.50 mg/L) and phosphorus (0.18 mg/L) thresholds were based on the 75th percentile of the reference site data from the Temperate Plains nutrient region which corresponds to ecoregion 46 in eastern South Dakota (Herlihy and Sifneos 2008).

Macroinvertebrate and fish community health provide the primary basis for determining whether a stream assessment unit is attaining applicable narrative standards and supporting designated uses. Quantifying the health of macroinvertebrates and fish provide a more holistic representation of overall biotic health. Both communities integrate the effects of multiple stressors overtime at different trophic levels. An Index of Biotic Integrity (IBI) was developed for wadeable streams in ecoregion 46 following processes described in Whittier et al. (2007). An IBI integrates sensitive measures of community structure and

function that are capable of discriminating between good (reference) and poor biological health. Core metrics scores are summed and scaled to provide a single IBI score that ranges from 100 to 0, with 100 being best condition. IBI thresholds were based on quartile deviations; 100 to 75 was considered good, 75 to 50 fair, 50 to 25 poor and less than 25 very poor biological integrity. An IBI score of less than 50 was used to indicate poor biological health.

A quantified measure of habitat condition was also used as a line of evidence especially if the fish and macroinvertebrate IBI scores display conflicting status. Habitat condition can provide an indication of a stream's physical potential to support a healthy biological community. It can also identify factors that may be impacting narrative standards and designated uses. A Habitat Condition Index (HCI) was developed using core habitat metrics that highly correlated with fish and macroinvertebrate metrics. Both indices were integrated to form a single HCI score. The HCI scoring convention was developed using the same processes used for IBI development (Whittier et al. 2007). The HCI scores are scaled from 100 to 0 to quantify overall habitat condition. An HCI score of less than 50 signifies poor habitat condition.

The current assessment methodology provides South Dakota with a process to identify streams impaired by nutrients or nutrient-related impacts. During the 2014 reporting cycle, EPA expressed concerns with the nutrient thresholds used in the initial screening process as not protective to make full support determinations. The assessment method was designed to use the best available nutrient thresholds strictly as a screening tool to identify stream assessment units for further evaluation with quantified measures of biological and habitat health. Stream assessment units that meet IBI and HCI thresholds in accordance with the assessment method provide a direct link to aquatic life use support. A full support determination implies that the aquatic community and habitat is in good to fair condition and clearly not impaired by nutrients or nutrient related impacts. A use support determination was not made for assessment units solely on meeting the nutrient thresholds.

DENR recognizes that the current assessment method requires refinement. Formal plans are in place to increase stream reference site capacity in ecoregion 46. Future efforts will focus on increasing reference site distribution and associated datasets, building stressor/response linkages and developing protective nutrients thresholds appropriate for the region. DENR will consult with EPA throughout the process to ensure future assessment methods and associated thresholds are based on appropriate indicators and analysis techniques. In the interim, DENR will continue to address narrative nutrient-related standards with the current assessment methodology under the premise that healthy aquatic community is not impacted by nutrients or nutrient related stressors. When data is not readily available to assess use support for nutrient related standards the use assessment will be based on numeric standards in accordance with the stream listing methodology (Table 3). Numeric standards include nutrient related stressors and therefore can address nutrient impacts in the interim until data requirements are met to assess with the more formal nutrient based assessment method.

A total of 20 total phosphorus (TP) and/or total nitrogen (TN) samples collected within the most recent 5-year period (2012-2017) were required to generate an average to begin the screening portion of the support assessment. If a single macroinvertebrate and fish IBI score was not available within the most recent 10-year period, the assessment unit was placed in user-defined subcategory 2N, indicating further assessment is required. An assessment unit was also placed in subcategory 2N if macroinvertebrate and fish IBI scores conflicted and a HCI score was not available. When IBI and/or HCI values were borderline (IBI-45-49; HCI 50-59) the water was also assigned to subcategory 2N to imply

that a reassessment will be conducted prior to a support determination. If results of the reassessment indicate IBI and/or HCI scores under the target thresholds, the assessment unit will be considered nonsupporting. A use support determination was not made for assessment units based solely on meeting the nutrient thresholds. DENR will consider assessment units in subcategory 2N a top priority for collection of adequate IBI and habitat information within a reasonable timeframe.

The following assessment units were removed from the stream nutrient assessment for the 2018 reporting cycle:

SD-JA-R-FOOT_01_USGS
SD-JA-R-MUD_01
SD-JA-R-SNAKE_01
SD-MN-R-LITTLE_MINNESOTA_02

The nutrient-related assessment methodology applies exclusively to perennial wadeable streams in ecoregion 46. Field visits conducted during the 2014 through 2017 field seasons revealed consistent dry conditions at all four stream segments. DENR made the decision to remove the assessment units from the nutrient-related narrative assessment for clearly exhibiting intermittent characteristics.

For this 2018 cycle, thirteen assessment units met the criteria to be assessed for nutrient-related narrative standards described in Table 4. Nine of the thirteen assessment units had average nitrogen or phosphorus concentrations above the respective thresholds. Four assessment units were carried over from the 2016 cycle to allow DENR to continue to monitor nutrients. Therefore, Table 5 contains a total of seventeen assessment unit identifiers (AUID).

Of the seventeen AUIDs in Table 5, IBI/HCI scores are available for twelve reaches. Nine of those reaches are fully supporting and three are still in Category 2N for further data collection. Of the seventeen AUIDs in Table 5, IBI/HCI scores have not been collected for three reaches which remain in subcategory 2N. DENR has made considerable progress in assessing nutrient-related narrative standards since this methodology was initiated in 2014.

When an assessment unit is considered impaired for not meeting the applicable narrative standard it will be placed on the 303(d) list with a cause of “unknown” until a stressor analysis or TMDL analysis determines the pollutant or pollutants impacting biotic integrity of the community of concern. The impairment is associated with the designated aquatic life uses.

Table 5: Nutrient-related Assessment Status of Stream Assessment Units in Ecoregion 46 in Eastern, South Dakota

Assessment Unit Identifier (AUID)	TN or TP meet thresholds	IBI/HCI Available	Assessment Status
SD-BS-R-SKUNK_01	NO	YES	Full Support
SD-BS-R-BIG_SIOUX_01	YES	YES	*Category 2N-reassess
SD-JA-R-ELM_01	NO	NO	Category 2N
SD-JA-R-FIRESTEEL_01	NO	NO	Category 2N
SD-JA-R-TURTLE_01	NO	NO	Category 2N
SD-JA-R-WOLF_01	NO	YES	Full Support
SD-JA-R-WOLF_02	NO	YES	Full Support
SD-JA-R-WOLF_SP_01	NO	YES	*Category 2N-reassess
SD-MN-R-LAC_QUI_PARLE_W_BR_01	YES	NO	Track AUID
SD-MN-R-LITTLE_MINNESOTA_01	YES	NO	Track AUID
SD-MN-R-WHETSTONE_01	NO	YES	Full Support
SD-MN-R-WHETSTONE_S_FORK_01	YES	YES	Full Support
SD-MN-R-WHETSTONE_S_FORK_02	NO	YES	Full Support
SD-MN-R-YELLOW_BANK_N_FORK_01	NO	YES	Full Support
SD-MN-R-YELLOW_BANK_S_FORK_01	YES	YES	Full Support
SD-VM-R-VERMILLION_E_FORK_01	NO	YES	*Category 2N-reassess
SD-VM-R-VERMILLION_E_FORK_02	NO	YES	Full Support

"*Category 2N-reassess" suggests IBI and/or HCI values were borderline (IBI 45-49; HCI 55-60). A second assessment is warranted to confirm support and/or impairment status.

"Track AUID" refers to those stream segments that met nutrient thresholds or have insufficient nutrient information to perform an assessment. DENR will continue to track these assessment units for evaluation of nutrient-related narrative standards.

Lake Assessment Methodology for Numeric Standards

Support determinations and impairment determinations were made for those lakes considered assessed. The minimum assessment requirements include two criteria; 1) at least two independent years of sample data and; 2) at least two sampling events per year. All available data from the most recent 10-year period (2007-2017) was used in the individual assessments. Older data was considered in the impairment analysis if deemed pertinent to the assessment. For example, if the exceedance rate for a particular water quality standard parameter was borderline (10%) older data were examined to determine if a trend exists in historic data.

The primary water quality data used to make impairment decisions were acquired from the following sources: the statewide lakes assessment project, individual lake assessment projects, outside entities, and when appropriate, citizens' monitoring efforts.

Statewide Lakes Assessment (SWLA) Project
In 2008, DENR adopted a random lake survey design. This sampling design allows DENR to select a subset of the most important water resources in the state, while the random component provides statistically valid results to make general determinations about the entire target population. A minimum of 50 lakes are sampled between reporting periods to achieve statistical confidence in the results. The number of lakes sampled (greater than 50) between reporting periods varies depending on available resources. The target population for the 2016-2017 survey included all lakes designated with coldwater or warmwater fish life, or recreation beneficial uses (575). Three waterbodies deemed publicly important were also sampled. A total of 69 lakes were sampled during the 2016-2017 growing season.

Lake sampling stations consist of one to three predetermined site locations within the basin of each lake. The number of site locations assigned to each lake is dependent on basin size. Field measurements are collected at each site and water samples are composited from each site. Lake data collected from the random subset of lakes is used to make support determinations and impairment decisions for each individual lake assessment unit. Results of the random probabilistic survey are documented in a separate section of the report and are not part of the individual lake assessments.

Lake Assessment Projects
Project specific data are usually collected monthly throughout the growing season and during winter months with safe ice conditions from site locations consistent with those established during the SWLA project. Field measurements and water samples are usually collected at each site.

Data from outside entities and citizens' monitoring efforts are used when sampling efforts follow similar protocol to the SWLA project or individual lake assessments.

A suite of water quality parameters is collected during standard assessment efforts. Water temperature, dissolved oxygen, conductivity, specific conductance, pH, and secchi disk transparency are measured on site. Chlorophyll-*a* is extracted from 50-1000 ml of lake sample and analyzed by spectrophotometer as described by APHA, (1998). Nitrate, TP, total Kjeldahl nitrogen, ammonia, alkalinity, TSS, total dissolved solids, and *E. coli* samples are processed and shipped to the State Health Laboratory in Pierre, South Dakota, for analysis.

Water sample data generally constitute parameters collected in a water sample approximately 0.5 meters from the surface and in some instances 0.5 meters from the

bottom, at a particular monitoring station or composited from multiple stations or depths throughout the water column. All available water sample data for a particular lake were used to analyze percent exceedances and ultimately make listing decisions.

Lakes are considered impaired if cumulative water quality standard data exhibit greater than 10% exceedances when 20 or more samples are available. If less than 20 samples are available, three exceedances are considered impaired. Impairment is assigned to toxic parameters (i.e., Total Ammonia Nitrogen) if more than one violation occurred in the last three years.

Water column profiles are generally collected during lake sampling visits. Profile data is collected at different depth increments from the surface to the bottom at multiple stations (2-3) throughout a lake to provide spatial coverage. The number of individual measurements is dependent on the depth of the respective water column. Profile measurements are generally recorded at 1.0 meter increments throughout the water column. Water quality standard parameters associated with vertical profiles include: dissolved oxygen, temperature, pH and specific conductance.

Lakes are considered impaired specifically for temperature, pH and specific conductance if greater than 10% exceedances (greater than 20 samples) occurred within the entire collection of profile measurements available for the specified 10-year period. When less than 20 samples were available, 3 exceedances were considered an impairment. The initial surface temperature and pH values for each station were not included in the profile data to avoid anomalous values associated with environmental conditions at the air-water interface.

Shallow, well-mixed lakes were also considered impaired for dissolved oxygen if greater than 10% exceedances (greater than 20 samples) occurred within the entire collection of profile measurements available for the specified 10-year period. When less than 20 samples were available, 3 exceedances were considered an impairment. Bottom dissolved oxygen readings were excluded from the datasets to avoid anomalous values associated with the sediment-water interface. For deeper, thermally stratified lakes, dissolved oxygen measurements were evaluated exclusively within the epilimnion and metalimnion. The epilimnion, metalimnion and hypolimnion are defined in the Surface Water Quality Standards ARSD Chapter (74:51:01:01).

If thermal stratification was not well defined an alternate process was used to evaluate whether an epilimnetic zone was present. In such instances, the epilimnion was determined by identifying the depth of the water column above the greatest thermal variation as defined by a change of greater than 1°C per meter (Wetzel, 2001). The water column above this zone of temperature deviation was considered representative of the epilimnion.

Some lakes have various depths and degrees of stratification among sites and sampling events. All representative dissolved oxygen values based on previously described criteria were collectively pooled and evaluated based on a percent exceedance. Again, if greater than 10% exceedances (greater than 20 samples) of the dissolved oxygen standard were observed within the collective profile measurements, the lake was considered impaired for dissolved oxygen and non-supporting the corresponding beneficial uses. If less than 20 samples were available, three exceedances were considered impaired.

Lake Assessment Methodology for Nutrient-Related Narrative Standards

South Dakota has several narrative water quality standards ARSD Chapters (74:51:01:05, 74:51:01:06, 74:51:01:08, 74:51:01:09, and 74:51:01:012) designed to protect beneficial uses of surface waters from nutrient-related impacts. The following nutrient-related assessment methodology was used to make support and impairment decisions for lakes during the 2018 reporting cycle.

Lake nutrient-related assessments were conducted using the same rationale and processes used for the 2016 Integrated Report. Lakes were evaluated with a multiple lines of evidence approach using region specific impairment thresholds based on the 75th percentile of reference lake data established by Herlihy et al., (2013). The nutrient regions of significance for the respective level III ecoregions in South Dakota and the associated thresholds are depicted in Table 6. See the map in Appendix E for locations of level III ecoregions in SD.

Table 6: Nutrient Ecoregion Specific Targets

Nutrient ecoregion		Level III ecoregion in SD	Chlorophyll-*a* ug/L	Total Phosphorus ug/L	Total Nitrogen ug/L
IV	Grass Plains (Manmade)	43	13.9	37	513
V	Cultivated Great Plains	42	49.9	117	1110
VI	Temperate Plains	46,47	37.8	108	1240

Chlorophyll-*a* concentrations were evaluated during the initial screening process. Waterbodies were considered impaired if the median chlorophyll-*a* concentration and 25% of individual samples exceeded the ecoregion specific threshold. When only one of the chlorophyll thresholds were exceeded, four additional indicators were evaluated and impairment was based on two additional indicators exceeding established thresholds. Table 7 depicts the different indicators and provides examples for different combinations used in the impairment determination process. A lake was considered assessed if ten indicator values were available during the growing season (May – September) over the data record from 2000 to 2017.

Table 7: Nutrient Indicator Thresholds and Examples of the Impairment Determination Process

Median. Chl-*a* > threshold	25% Chl-*a* > threshold	TP > threshold	TN > threshold	Ave. Secchi <0.7 m	large # rough fish	Status
yes	yes	–	–	–	–	impaired
no	no	–	–	–	–	not impaired
no	yes	no	yes	no	yes	impaired
yes	no	no	yes	no	no	not impaired
no	yes	yes	yes	no	no	impaired

A chlorophyll-*a* threshold of 10 µg/L was used for waterbodies with the beneficial use of Domestic Water Supply waters. When available, DENR reviewed GF&P fish survey reports to evaluate the significance of rough fish (i.e. carp and bullheads). The Secchi depth threshold (less than 0.7 m) was based on user perception survey conducted in the Northern Glaciated Plains ecoregion of Minnesota. (Heiskary and Walker, 1988).

Based on the comprehensive assessment of applicable waterbodies, ninety-four lake assessment units were evaluated with nutrient-related narrative criteria. Thirty-seven lakes were considered to support applicable uses and twenty-nine lakes did not support applicable uses. Twenty-eight lakes did not have sufficient data to make support determinations based on minimum data requirements. Waterbodies designated with the beneficial use of warmwater marginal fish life propagation were excluded from the nutrient-related assessment for the 2018 reporting cycle.

The nutrient-related narrative standards being evaluated for lakes have implications to both aquatic life and recreation uses. Therefore, support determinations for lakes evaluated for nutrient-related narrative standards were applied to the domestic water supply designated use (1), fish life propagation uses (2, 3, 4, 5), and both (7, 8) recreation uses.

The current assessment methodology provides South Dakota with a process to identify waterbodies "clearly" impaired by nutrients or nutrient-related impacts. However, EPA has expressed concerns that the reference-based chlorophyll and nutrient thresholds adopted as part of a larger regional effort are not "protective" of the uses. As a result, DENR is working internally and collaboratively with EPA Region 8 staff to develop a refined assessment method with protective thresholds that best represent waterbodies in South Dakota. The timeline goal is to have a new nutrient-related assessment methodology for the 2020 reporting cycle. DENR worked in conjunction with EPA Region 8 staff to develop a nutrient-related assessment method with protective thresholds to assess waterbodies in the Black Hills region (ecoregion 17). The methodology and rationale is documented below.

<u>Ecoregion 17 Black Hills</u>

An independent assessment methodology was developed to evaluate nutrient-related impairment and beneficial use support for waterbodies in the Black Hills. A comprehensive data analysis using all available data was conducted to explore the best practical indicator(s) and impairment threshold(s) protective of the assigned beneficial uses.

The data analysis supported a reference approach to set protective chlorophyll-*a* targets for two classes of waterbodies. Assessed waterbodies in the Black Hills were classified into two groups based on physical characteristics (size, depth, and retention time) (Table 8). The initial reference lake identification process used a traditional watershed disturbance approach to locate lakes least impacted by human activity. Unfortunately, many waterbodies with relatively undisturbed watersheds did not always correlate with actual water quality condition. Reference lakes were selected based on DENR's knowledge of exceptional water quality and no prior history of impairment with respect to nutrients and productivity (i.e. algae), as well as having a watershed that is relatively undisturbed.

Table 8: Assessment Units in Ecoregion 17 of the Black Hills

Large Reservoirs (AUID)	Small Reservoirs/Lakes (AUID)
SD-CH-L-PACTOLA_01*	SD-CH-L-BISMARK_01
SD-CH-L-DEERFIELD_01*	SD-CH-L-CANYON_01
SD-CH-L-SHERIDAN_01	SD-CH-L-CENTER_01
	SD-CH-L-COLD_BROOK_01*
	SD-CH-L-COTTONWOOD_SPRINGS_01*
	SD-CH-L-HORSETHIEF_01
	SD-BF-L-IRON_CREEK_01
	SD-CH-L-LAKOTA_01
	SD-CH-L-LEGION_01
	SD-BF-L-MIRROR_EAST_01*
	SD-BF-L-MIRROR_WEST_01*
	SD-CH-L-STOCKADE_01
	SD-CH-L-SYLVAN_01

*Indicates a reference waterbody

Pactola and Deerfield reservoirs were selected to represent reference condition for the large reservoir category. Cold Brook, Cottonwood Springs, and Mirror Lakes 1 and 2 were considered reference for the small waterbody category. Numeric chlorophyll-*a* targets for each size class were based on the 90th percentile [log-back transformed] of the annual growing season median values for each reference group. Table 9 describes the chlorophyll-*a* thresholds used to make nutrient-related listing decisions for waterbodies in ecoregion 17 of the Black Hills.

Table 9: Chlorophyll-*a* Impairment Thresholds for Large and Small Waterbodies in the Black Hills

Large Waterbodies	Small Waterbodies
Median growing season chlorophyll-*a* (corrected for pheophyton) ≤ 7 µg/L	Median growing season chlorophyll-*a* (corrected for pheophyton) ≤ 8 µg/L

Reference-based chlorophyll-*a* thresholds for both waterbody size classes are below 10 µg/L. Chlorophyll-*a* concentrations of less than 10 µg/L in lake environments have been associated with low cyanobacteria dominance and corresponding risk of cyanotoxin, generally considered protective of recreation and domestic water supply uses (Downing et al. 2001). GF&P surveyed anglers at several popular Black Hills reservoirs to gain information on angling satisfaction at varying levels of chlorophyll-*a* concentration. Results of the survey showed anglers had enjoyable angling experiences in waterbodies with mean growing season chlorophyll-*a* concentrations at or below 10 µg/L.

A waterbody was considered impaired if a minimum five growing season median values were available and two values exceeded the class specific chlorophyll-*a* threshold in the most recent ten year period. Waterbodies with less than five annual growing season median values were placed in user-defined subcategory 2N. DENR considers assessment units in subcategory 2N a high priority for sampling. All assessment units (n=16) had insufficient chlorophyll-*a* data to be assessed during the 2018 reporting cycle. DENR intends to sample waterbodies in the Black Hills during the 2018 and 2019 field seasons to obtain sufficient information to make assessment determinations for the 2020 reporting cycle, resources permitting. This assessment methodology provides a means to evaluate nutrient related narrative standards and is applicable to the assigned beneficial uses of waterbodies in ecoregion 17 of the Black Hills.

Assessment Categories

South Dakota uses assessment categories recommended in EPAs 2006 IR guidance document. DENR added a user-defined sub category (2N). South Dakota's assessment categories are described below:

Category 1:	All designated uses are met;
Category 2:	Some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met;
Subcategory 2N:	Additional data is required to determine if nutrient-related narrative standards are met;
Category 3:	Insufficient data to determine whether any designated uses are met;
Category 4A :	Water is impaired but has an EPA approved TMDL;
Category 4B:	An impairment caused by a pollutant is being addressed by the state through other pollution control requirements;
Category 4C:	Water is impaired by a parameter that is not considered a "pollutant;" and
Category 5:	Water is impaired or threatened and a TMDL is needed.

Beneficial use support determinations made by South Dakota for border waters may differ from determinations made by bordering states. States may have different beneficial uses and applicable water quality standards assigned to waterbodies. In addition, differences in monitoring strategy, assessment methodology, and other factors may affect the support determination. DENR coordinates with border states to address water quality concerns.

STATEWIDE SURFACE WATER QUALITY SUMMARY

Approximately 5,916 miles of rivers and streams have been assessed to determine water quality status for a period covering the last five years (October 2012 through September 2017). The five-year time span is necessary to ensure enough data points are available for each stream segment to properly characterize existing stream conditions and adequately portray the natural variability in water quality.

Currently, 26.5% of the assessed stream miles fully support all assigned beneficial uses. Nonsupport in assessed streams was caused primarily by *E. coli* bacterial from agricultural nonpoint sources and wildlife. In approximate order of stream miles affected, causes of impairment this reporting cycle include: *E. coli,* TSS, sodium adsorption ratio (salinity), specific conductance, mercury in fish tissue, total dissolved solids, dissolved oxygen, water temperature, pH, and cadmium. Natural pollutant sources of dissolved and suspended solids are exemplified by erosive soils that occur in western South Dakota badlands and within the Missouri River basin (including considerable exposed marine shale formations) and in extreme southeastern South Dakota (including large areas of highly erodible loess soils). Storm events that produce moderate to significant amounts of precipitation contribute to suspended sediment problems over large areas of the state, particularly in the west and southeast. *E. coli* concentrations also increase significantly during times of precipitation and runoff events. Appropriate best management practices should be applied to treat the sources of these and other parameters whose effects are likely to be masked during periods of low precipitation.

On a positive note, 100 percent of stream miles assessed for alkalinity, ammonia, arsenic, chloride, chromium, copper, cyanide, lead, mercury, nickel, nitrate, radium, selenium, silver, sulfate, and zinc met associated water quality standards.

In addition to rivers and streams, South Dakota has 575 classified lakes and reservoirs totaling approximately 213,265 acres. These lakes are listed in ARSD Chapter 74:51:02 and classified for aquatic life and recreation beneficial uses. GF&P presently manages approximately 500 lakes for recreational fishing.

Excluding the four Missouri River reservoirs, an estimated 30% of the lakes and reservoirs have been assessed, accounting for 67% of the total lake acreage. An estimated 15.7% of the lake acreage was considered to support all assessed beneficial uses. This is a decrease from 21% in the 2016 Integrated Report. The decline in support from the 2016 and 2014 IR cycles is attributed to adopting the water quality criterion of 0.3 mg/kg mercury in fish tissue. Based on lake acreage, the primary causes of non-support are mercury in fish tissue, chlorophyll-*a*, temperature, pH, dissolved oxygen, and sodium adsorption ratio (salinity). While many factors influence mercury methylation and bioaccumulation rates, the sources of mercury in fish tissue are mostly atmospheric deposition from sources outside of South Dakota. DENR completed and received final EPA approval for a statewide mercury TMDL, which included 75 waters not supporting the mercury in fish tissue standard. In general, chlorophyll-*a* is attributed to nonpoint source pollution while temperature and sodium adsorption ratio are attributed to natural sources.

Many lakes and reservoirs meet water quality standards associated with designated uses. Seventy percent of lake acres assessed were considered to fully support the limited contact and immersion recreation uses. In addition, 100% of the assessed lake acreage complied with bacteria standards in accordance with the listing methodology. The majority of lake acreage assessed for warmwater and coldwater fish life uses also complied with water quality standards. Over 70% of the assessed lake acreage complied with standards for specific conductance, pH, dissolved oxygen, water temperature and total dissolved solids. In addition, 100% of the lakes acres assessed for total suspended solids, nitrates, total ammonia, and total alkalinity complied with standards for warmwater and coldwater beneficial uses in accordance with the listing methodology.

Most lakes and reservoirs in the state are characterized as eutrophic to hypereutrophic. They tend to be shallow, turbid, and are well supplied with dissolved salts, nutrients, and organic matter from often sizeable watersheds of nutrient rich glacial soils that are extensively developed for agriculture. Runoff carrying sediment and nutrients from agricultural land is the major nonpoint pollution source.

Category status comparisons between 2016 and 2018 for streams and lakes are summarized in Tables 10 and 11. The mileage/acreage of causes of nonsupport for assessed surface waters in South Dakota are summarized in Tables 12.

The general statistics reported are intended to characterize category status and causes of nonsupport for the 2018 reporting cycle. Due to multiple factors, it is not feasible to determine trends between reporting cycles.

Table 10: 2018 Category Status for Rivers and Streams in South Dakota vs 2016

2016			2018		
EPA Category	Total Size (miles)	Number of Assessment Units	EPA Category	Total Size (miles)	Number of Assessment Units
1	876.86	45	1	1,311	55
2	371.18	8	2	259	7
3	677.88	25	3	365	10
4A	996.09	32	4A	828	23
4B	0	0	4B	0	0
4C	0	0	4C	0	0
5	3,614.2	88	5	3,517	90

Table 11: 2018 Category Status for Lakes in South Dakota vs 2016

2016			2018		
EPA Category	Total Size (acres)	Number of Assessment Units	EPA Category	Total Size (acres)	Number of Assessment Units
1	26,661.25	32	1	19,820	30
2	1,948.66	9	2	1,842	8
3	6,670.44	11	3	6,724	10
4A	60,533.37	65	4A	58,484	61
4B	0	0	4B	0	0
4C	0	0	4C	0	0
5	48,698.81	55	5	57,757	62

Table 12: Total Sizes of Water Impaired by Various Cause Categories in South Dakota

River/Streams	
Causes/Stressor Category	**Miles**
Cadmium	2
Dissolved Oxygen	285
pH (high)	27
Salinity/SAR	1,015
Specific Conductance	565
Temperature	174
Total Dissolved Solids	327
Total Suspended Solids	2,025
Mercury in fish tissue	415
E. coli	2,809
Lakes/Reservoirs	
Cause/Stressor Category	**Acres**
Dissolved Oxygen	12,367
Chlorophyll-*a*	25,678
Mercury in fish tissue	85,338
Nitrates	50
pH (high)	13,017
Selenium	50
Specific Conductance	50
Temperature	13,951
Total Dissolved Solids	50
Salinity/SAR	5,070

Mileage/acreage values generated by ATTAINS are carried out to the 100th decimal place. The table reflects mileage values rounded to the nearest whole number.

LAKE WATER QUALITY ASSESSMENT

A total of 575 lakes and reservoirs are currently designated with the beneficial uses of recreation and warmwater or coldwater fish life in South Dakota. Thirty-nine assessed lakes in South Dakota have a surface area greater than 1,000 acres and have a combined surface area of 113,329 acres. Lake monitoring and assessment efforts have been conducted routinely since 1989 as part of the DENR's SWLA project. Additional lake data have also been acquired from individual assessment projects and citizens monitoring efforts. Approximately 30% of the 575 classified lakes have been assessed accounting for 67% of the total lake acreage.

Water quality standards designed to protect designated beneficial uses were evaluated for each lake in accordance with applicable listing methodologies. The assessment results suggest 30 lakes fully supported all beneficial uses and 123 failed to support one or more beneficial uses. Eighteen lakes did not meet minimum data requirements and were considered not assessed or to have insufficient data.

The low number of lakes and reservoirs meeting all assigned beneficial uses can be attributed in large part to mercury in fish tissue. Prior to the 2016 reporting cycle, only 18 lakes were considered not supporting for mercury based on a fish consumption advisory. In 2016, DENR adopted EPA's mercury in fish tissue standard of 0.3 mg/kg. As a result, nearly all lakes sampled for mercury in fish tissue were deemed not supporting aquatic life propagation uses.

DENR received final EPA approval for a statewide mercury TMDL, which included 75 waters not supporting mercury in fish tissue. The TMDL documented that the primary source of mercury in South Dakota comes from global atmospheric deposition. Therefore, the low incidence of nonsupport for lakes is not likely to improve until measures to reduce mercury are implemented at a global scale.

Another main cause of nonsupport continues to be excessive algae (blooms) due to nutrient enrichment from watershed scale nonpoint sources and internal loading.

A Trophic State Index approach was used to determine the trophic status of assessed lakes (Carlson, 1977). The primary trophic state indicators are phosphorus, Secchi depth transparency and chlorophyll-*a*. Carlson (1991) suggests the chlorophyll index provides the best measure of lake productivity and trophic state. The average chlorophyll TSI was used to classify the trophic status of assessed lakes and reservoirs in South Dakota (Table 13).

Table 13: Trophic Status of Assessed Lakes

Trophic Status	Number of Lakes	Acreage of Lakes
Total with Beneficial Use Criteria	575	213,265
Total Assessed	171	144,627
Oligotrophic	1	822
Mesotrophic	24	23,944
Eutrophic	75	76,999
Hypereutrophic	43	27,767
Unknown	28	15095

The major problems of South Dakota lakes continue to be excessive nutrients, algae, and siltation due to nonpoint source pollution (primarily agricultural). Although land use practices have improved in many agricultural watersheds, internal phosphorus recycling continues to negatively impact the trophic state of many lakes. Aging reservoirs have also become more eutrophic as many are now approaching their expected life spans. Water quality degradation due to acid precipitation, acid mine drainage, or toxic pollutants, is presently not a problem in South Dakota lakes.

Acid Effects on Lakes

During Lake Water Quality Assessments, each lake is measured for field pH. Monitoring efforts from 1989 to 2017 suggest none of the assessed lakes (n=139) had acidic pH conditions (Table 14). DENR is not aware of any lakes in South Dakota that are currently impacted by acid deposition. This is attributed to a lack of industrialization and a natural buffering capacity of the soils.

Table 14: Acid Effects on Lakes

	Number of Lakes	Acreage of Lakes
Assessed for pH	139	130,061
Impacted by Acidity (<6.5)	0	0
Vulnerable to Acidity (<6.5)	0	0

Trends in Lake Water Quality

The trophic state of a lake can be monitored over time to track changes in water quality for prioritizing management decisions. Long term trends were determined for South Dakota lakes using all available growing season (May-September) data collected during DENR's annual SWLA efforts, individual lake water quality assessments projects, and when appropriate, citizens monitoring efforts. The TSI values for chlorophyll-*a*, were calculated for each individual sample. The slope of a regression line was calculated for each TSI measurement over time. If a lake had less than two independent years of data, it was not included due to insufficient data.

A total of 168 waterbody assessment units were included in the trend assessment. The chlorophyll TSI trend analysis yielded slopes of less than 5% in nearly all assessed waterbodies indicating stable or non-significant change (Table 15). One lake displayed a borderline positive slope above 5% (5.3%) suggesting increasing algae biomass overtime equating to degrading condition. A total of 50 lakes were considered to have an unknown trend due to insufficient chlorophyll data.

Due to the limited timeframe it is difficult to describe the significance of trends in trophic condition. Trends can be related to natural or seasonal variability and natural hydrologic conditions associated with wet and dry cycles. A significant amount of TSI data collected over time is necessary to establish trends in water quality. In general, all assessed lakes display relatively stable trophic conditions consistent with the 2016 reporting cycle.

Table 15: Long Term Trends in Assessed Lakes (1989-2017)

	Number of Lakes	Lake Acreage
Assessed for Trends	167	142,174
Improving	0	0
Stable	117	113,834
Degrading	1	80
Unknown	50	28,324
Fluctuating	0	0

STATEWIDE PROBABILISTIC LAKE ASSESSMENT

South Dakota's lake monitoring program used a random probabilistic survey design during the 2016-2017 field seasons. Lake data collected during this period yielded statistically valid results to make inferences about the entire population of lakes with designated fish life propagation and/or recreation beneficial uses for the 2018 reporting cycle. Confidence intervals (margin of error) varied from 5% to 10% dependent on number of measurements collected. Results that fall within the confidence interval are statistically similar.

The total lake population consisted of 575 lakes designated the beneficial uses of recreation and/or warmwater or coldwater fish life propagation accounting for 213,265 lake acres in South Dakota. The Missouri River main stem reservoirs were excluded from this survey. The survey design utilized three strata; targeted lakes, managed fisheries and unmanaged fisheries. Seventy lakes were selected for sampling during the 2016-2017 field seasons. The lake data from 2016 and 2017 was combined to generate a single analysis of lake condition for the 2018 reporting cycle. The 2010 Integrated Report included results from the first statistical survey for lakes in South Dakota. Statistical survey results from 2010, 2012, 2014 and 2016 were included with the 2018 results to provide a framework for future trend analysis. Climate variability cannot be adequately explained with the limited number of reporting cycles and although some indicators show significant increases or decreases, caution should be used when implying a trend.

Population Description

Lakes were assigned to a cold or warmwater fish life propagation use designation based on depth, surface area, permanency, geographic location and other characteristics. Figure 2 depicts the size distribution of the fishery classified lakes in the state.

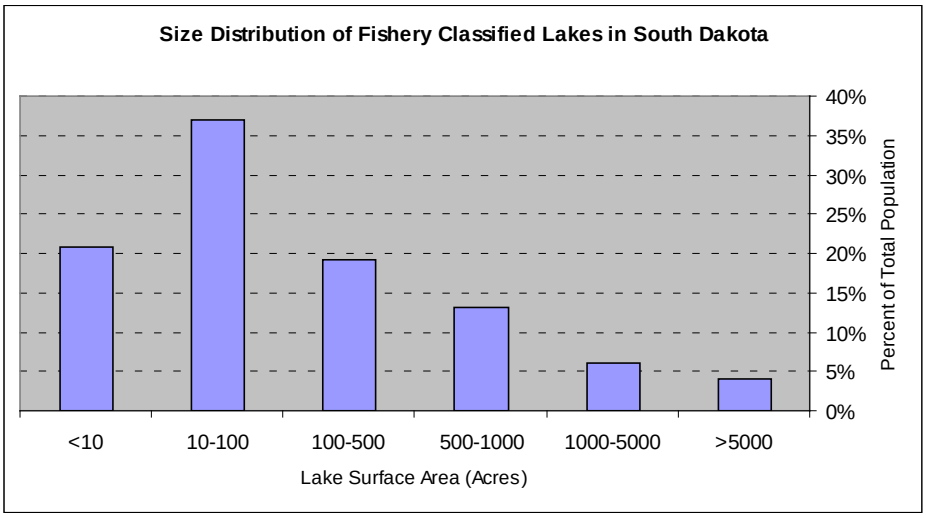


Figure 2: Size Distribution of Fishery Classified Lakes in South Dakota

Lakes are assigned to a specific fish life propagation beneficial use based on the type of species and survival rates expected for the waterbody. All lakes assigned to a warmwater or coldwater fish life beneficial use are also assigned the beneficial uses of immersion and limited contact recreation. Beneficial uses contain water quality standards consisting of physical and chemical parameters and associated numeric criteria which provide benchmarks to make beneficial use support decisions (ARSD 74:51:01-02). Beneficial use support for the total population was determined by evaluating four water quality standard parameters (E. coli, Dissolved Oxygen, pH and Water Temperature) associated with fish life propagation and recreation uses. Lakes in the random subset were compared to assigned beneficial use specific water quality standards.

Warmwater fisheries are expected to support communities at greater temperatures and lower dissolved oxygen concentrations than coldwater fisheries. Warmwater marginal fisheries are typically shallow systems (3 meters or less) prone to winter kill while warmwater permanent fisheries are expected to support a reproductive fishery during most years.

Coldwater permanent fisheries are expected to have little chance of winter kill and sustain a coldwater reproductive fishery. Coldwater marginal fisheries are more reflective of the species desired in the water body than its ability to support a reproductive community. These waterbodies are frequently managed as “put and take” fisheries where catchable size fish (generally salmonids) are released for public consumption with limited expectations of year to year survival or reproduction success.

E. coli

The bacterium *E. coli* was targeted as the primary indicator to determine recreation use support for the total population of classified lakes. *E. coli* sampling was conducted in early June at each of the randomly selected waterbodies. Sample location was determined upon arrival at each waterbody. Sites were selected based on their likelihood of human use and contact. Boat launches and developed recreation areas were used as a first choice. In the absence of any sort of developed access or visible access point, samples were collected by wading in at the most convenient access point available.

The single sample maximum *E. coli* water quality criterion for limited contact (1,178 colonies/100mL) and immersion recreation (235 colonies/100mL) was used to evaluate

recreation use support. Data from the current and previous statistical surveys indicate that nonsupport of the recreation uses due to *E. coli* concentrations continues to remain low for the total lake population (Table 16).

Table 16: Percentage of Lakes in the Total Population Not Supporting Recreation Uses Due to Bacteria

E coli					
Recreation Use	**2010**	**2012**	**2014**	**2016**	**2018**
Limited Contact	1.30%	0.00%	0.50%	2.10%	1.20%
Immersion	9.00%	6.20%	0.70%	2.10%	7.24%

Dissolved Oxygen

Dissolved oxygen concentrations are a critical standard for aquatic life survival. Dissolved oxygen standards apply anywhere in the water column of a non-stratified water body, or in the epilimnion and metalimnion of a stratified water body. Measurements recorded near the bottom of lakes tended to be lower in dissolved oxygen than those measured at or near the surface. This condition is expected in lakes that have sufficient depth to prevent mixing, resulting in stratification. Mixing depth is variable between lakes, but most frequently occurs between 1 and 3 meters of depth. Dissolved oxygen concentrations were evaluated by two separate methods. Water column maximums were compared to the waterbodies fishery and recreation standards. If the maximum dissolved oxygen value in the water column was below the associated standard the waterbody was considered not supporting.

A water column median was used as a mechanism to evaluate potential risk of nonsupport to account for lakes that exhibit stratification. Actual support could not be determined with this method because depth of the epilimnion and metalimnion in stratified lakes is variable and D.O below the standards in the hyperlimnion could exceed 50% of the total measurements, but still be meeting D.O criteria. Nonetheless, if over 50% of the D.O measurements in the water column of a stratified lake exceed D.O criteria the lake was considered at risk of not supporting the assigned fish life propagation beneficial use due to dissolved oxygen.

In the past five reporting cycles, less than five percent of waterbodies in the total population were considered not supporting the fishery use for exhibiting maximum dissolved oxygen concentrations below water quality standards. In addition, ten percent or less of the waterbodies in the total population was considered at risk of nonsupport for exhibiting median dissolved oxygen concentrations below the water quality standards, exception 2010 (Table 17).

Table 17: Percentage of Lakes in the Total Population Not Supporting and at Risk of Not Supporting Beneficial Uses Due to Low Dissolved Oxygen

Dissolved Oxygen					
Criteria Evaluated	2010	2012	2014	2016	2018
*Water Column Maximum	4.0%	2.3%	3.9%	2.6%	4.9%
**Water Column Median	17.0%	10.0%	5.7%	8.3%	7.5%

*Nonsupport determination
**At risk of nonsupport

pH

The maximum pH standard for all lakes assigned a cold or warmwater fish life propagation beneficial use in South Dakota is 9.0 standard units. Historically, South Dakota lakes and reservoirs have not experienced acidity problems resulting in pH values below the water quality standard minimum of 6.0 standard units. References to nonsupport are limited to lakes that exhibited pH values in excess of 9.0 standard units. Elevated pH values are frequently linked to high productivity as a result of photosynthetic activity from plants and algae within the water column. Lakes in the plains portion of the state have higher alkalinity levels than those in the Black Hills resulting in a greater ability to buffer against significant shifts in pH. Some reservoirs in the Black Hills have considerably lower alkalinity levels than the plains lakes, and are more susceptible to significant shifts in pH over shorter periods of time.

Because pH measurements can vary within the water column of lakes, three separate evaluations were conducted to describe beneficial use support using the pH criterion of >9.0 standard units (Table 18). First, the water column minimums represent those lakes in the population in which minimum pH measurements in the water column exceeded 9.0 su. Water column medians indicate lakes in the population for which greater than half the pH measurements in the water column exceeded 9.0 su. The water column maximum indicates lakes in the population where a single pH measurement in the water column exceeded 9.0 su. The percentage of lakes in the total population that experience pH exceedances has been variable between reporting cycles. A considerable increase in pH exceedance was evident during the 2018 reporting cycle in comparison to other reporting cycles. Approximately 1/3 of the total population experienced high pH levels during the 2016 and 2017 field seasons.

Table 18: Percentage of Lakes in the Total Population Not Supporting Beneficial Uses Due to High pH

pH					
Criteria Evaluated	2010	2012	2014	2016	2018
*Water Column Max	15.0%	6.9%	24.8%	15.6%	37.1%
**Water Column Median	4.0%	3.8%	23.6%	13.2%	36.1%
**Water Column Min	NA	NA	20.3%	10.4%	33.6%

*Nonsupport determination
**At risk of nonsupport

Temperature

Water column temperatures affect the amount of dissolved oxygen available for aquatic life. Coldwater species are less tolerant of low dissolved oxygen and warm temperatures, particularly during spawn. Figure 3 depicts the water column temperature distribution in lakes for the various fish life beneficial uses.

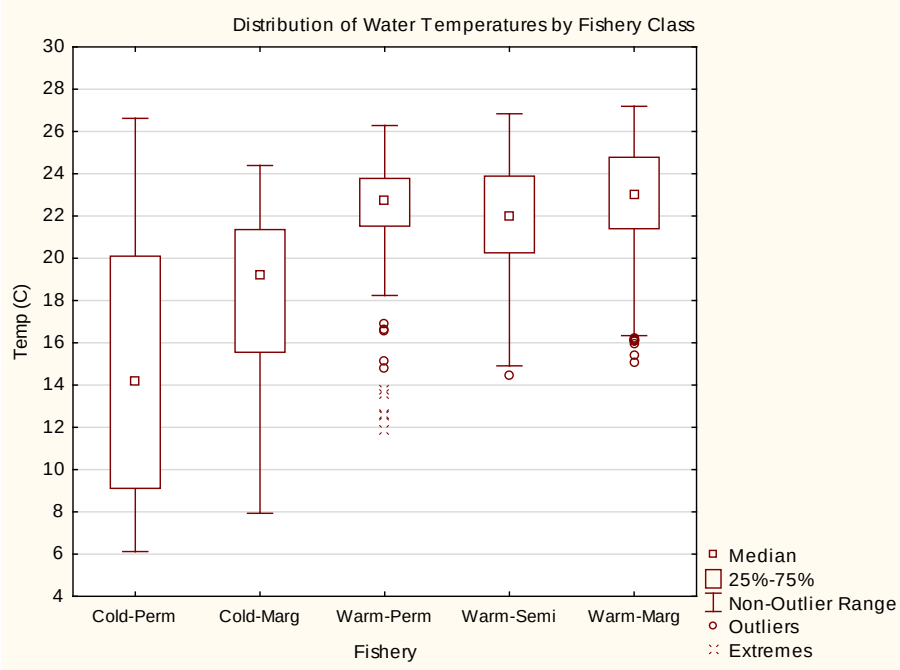


Figure 3: Temperature Distributions by Fishery Beneficial Use

Water temperature was evaluated with two separate methods. Water column temperature values were compared to the standards for the associated fish life propagation beneficial uses. If the maximum temperature value in the water column exceeded the associated standard the waterbody was considered not supporting.

A water column median value was used a mechanism to evaluate deeper thermally stratified lakes where temperature is expected to be cooler in the deeper portions of the lake. When the median or 50% of the temperature values in the water column were above the standard it was considered at risk of not supporting for temperature. The number of lakes with temperatures above the standard was higher than previous cycles (Table 19). Similar to previous reports, coldwater permanent fisheries were more likely to have portions of the water column (epilimnion) above the standard than other fishery classes.

Table 19: Percentage of Lakes in the Total Population Not Supporting Beneficial Uses Due to Elevated Temperature

Temperature					
Criteria Evaluated	2010	2012	2014	2016	2018
*Water Column Maximum	4.0%	15.5%	5.0%	3.4%	14.1%
**Water Column Median	1.0%	9.0%	2.2%	1.4%	12.2%

*Nonsupport determination
**At risk of nonsupport

RIVER BASIN WATER QUALITY ASSESSMENTS

South Dakota has fourteen major river basins, most of which drain into the Missouri River (Figure 4). The following sections contain brief narratives that discuss noteworthy waterbodies and pollution problems. A detailed state map showing assessed lakes and streams provides general use support information (Figure 5). More specific information is provided in the accompanying river basin tables for the monitored waterbodies in each river basin.

The River Basin Tables (Tables 20-33) represent South Dakota's 305(b) Surface Water Quality Assessment. The table information contains the waterbody name, assessment unit identification, reach location, beneficial uses, support determinations, cause of nonsupport, source (if known), and EPA category.

DENR does not sample all waterbodies for all possible contaminants. In the following basin tables, some waterbodies may be nonsupporting for a particular cause, and another waterbody may not have been sampled for that particular cause. Most sampled parameters for each reach have been entered into EPA's ATTAINS system and can be accessed at:
https://www.epa.gov/waterdata/assessment-and-total-maximum-daily-load-tracking-and-implementation-system-attains.

Not all sources of impairment have been identified for this reporting cycle. Unidentified sources of impairment have been left blank in Tables 20 – 33. Sources of impairment are identified during watershed assessments and TMDL development. In the basin tables, sources are not listed in any particular order and the reader should not assume the source list order lends greater significance.

Fecal coliform was removed from South Dakota's Surface Water Quality Standards in 2017 following a series of actions involving the state's Water Management Board, Interim Legislative Rules Review Committee and EPA Region 8. As a result, fecal coliform was removed as a cause of impairment from 51 stream assessment units during the 2018 IR development process (Appendix C).

In 2008, DENR adopted the bacterial indicator *E. coli* into the Surface Water Quality Standards to protect recreation beneficial uses. *E. coli* is a fecal coliform bacterium and both indicators originate from common sources in relatively consistent proportions. In general, most of the assessment units identified as impaired for fecal coliform were also impaired for *E. coli*. DENR received EPA approval for many fecal coliform TMDLs over the past several years (Appendix A). DENR scientists developed a conversion factor using years of paired fecal coliform and *E. coli* data. Results of the analysis suggest nearly a 1:1 ratio. Because the two bacterial indicators were determined to be interrelated, fecal coliform TMDLs can be considered useful for implementing measures to correct *E. coli* impairment. DENR plans to work with EPA region 8 on a process to convert fecal coliform TMDLs to *E.coli* TMDLs for several assessment units that have a fecal coliform TMDL and are currently on the 303(d) list for *E. coli.*

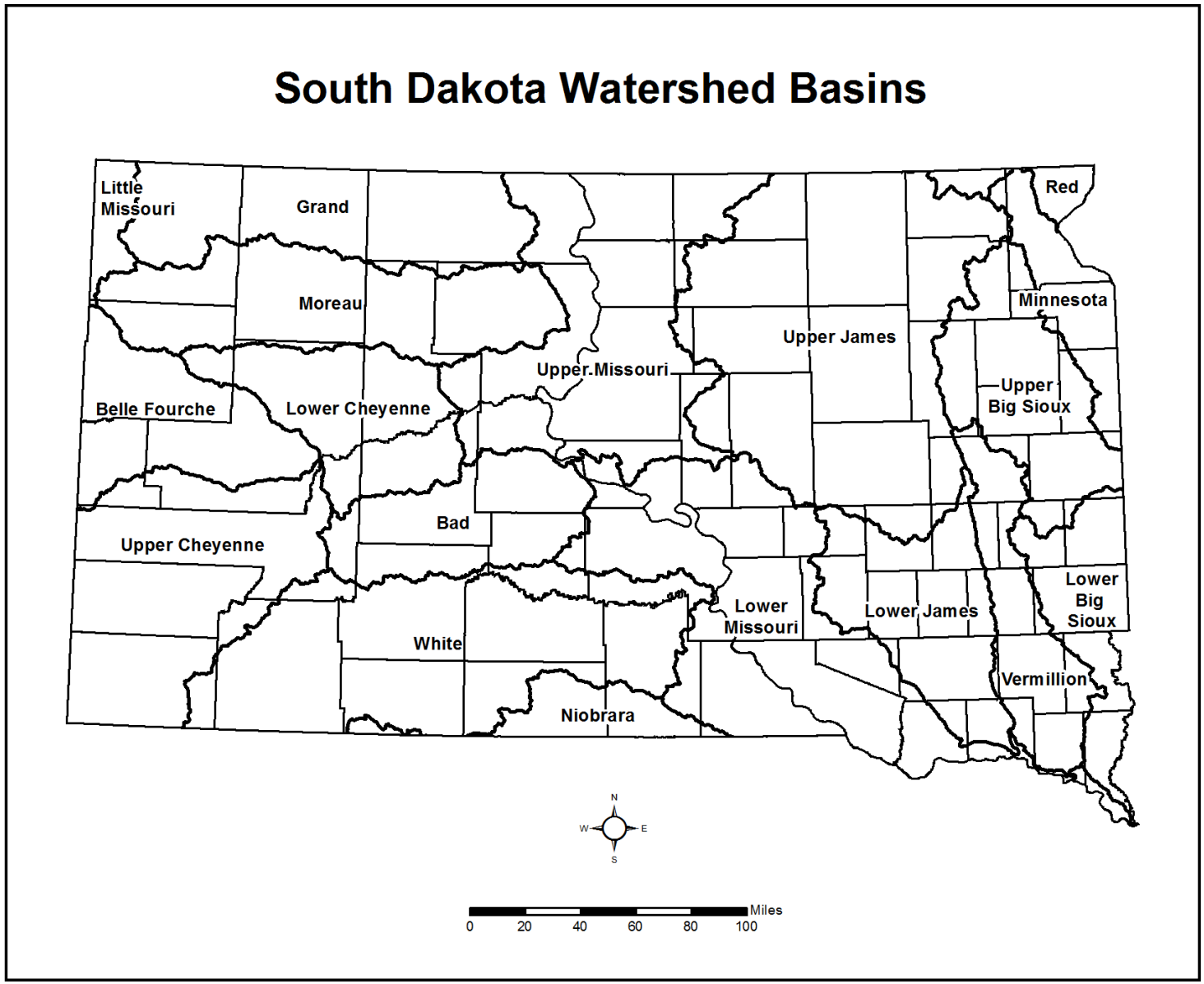


Figure 4: Major River Basins in South Dakota

Statewide Integrated Report

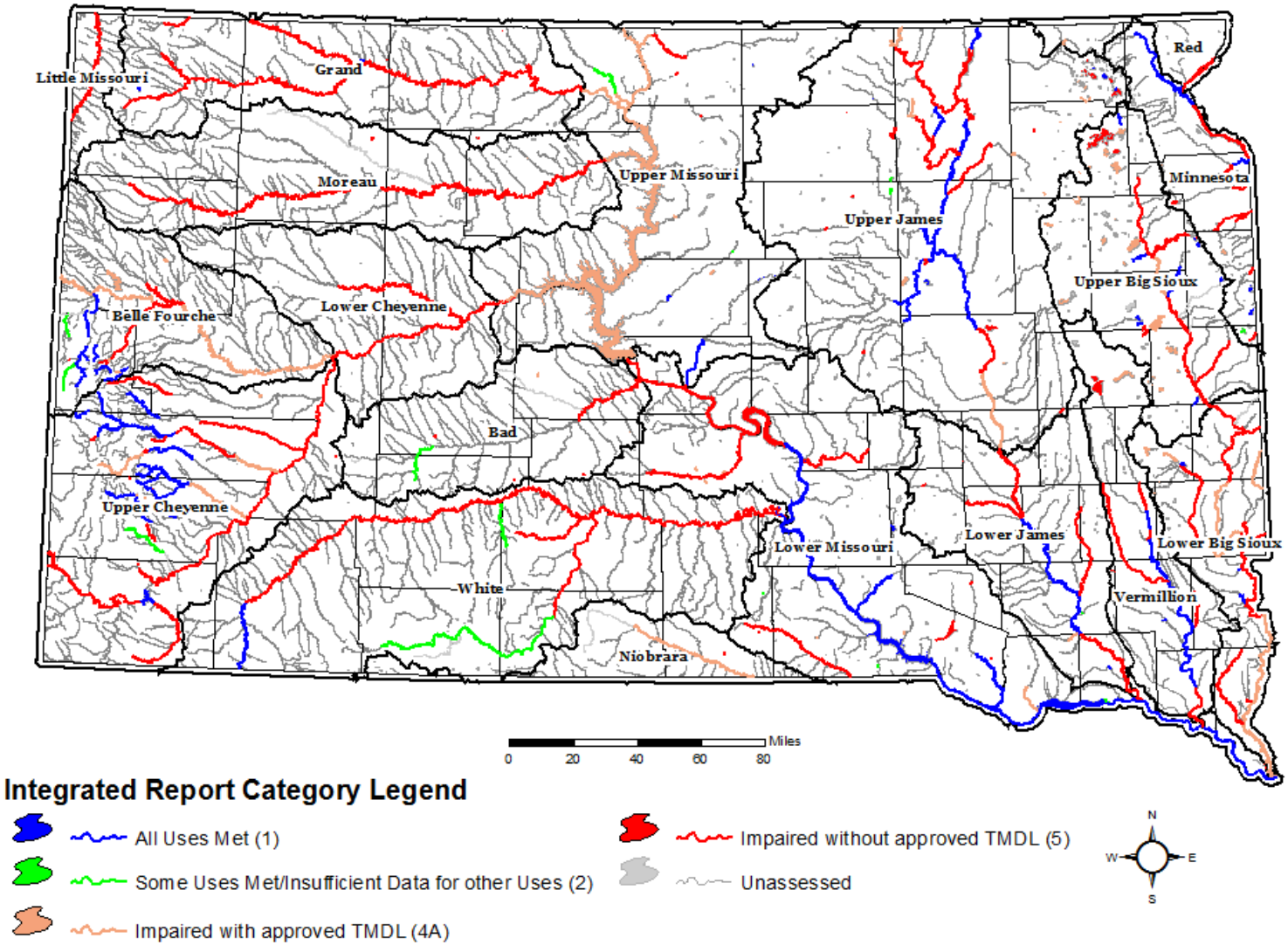


Figure 5: 2018 South Dakota Waterbody Status

KEY FOR RIVER BASIN INFORMATION TABLES

Waterbody- Name of Waterbody
Location- Best available description or reach segment
Map ID- Map identification
Use- Beneficial use assigned to waterbody

EPA Category- EPA Support Category
Category 1: All designated uses are met;
Category 2: Some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met;
Category3: Insufficient data to determine whether any designated uses are met;
Category 4A: Water is impaired but has an EPA approved TMDL;
Category 4B: An impairment caused by a pollutant is being addressed by the state through other pollution control requirements;
Category 4C: Water is impaired by a parameter that is not considered a "pollutant;"
Category 5: Water is impaired or threatened and a TMDL is needed.

Support Status (Lakes and Streams):
Full = Full Support
Non = Nonsupport
INS = Insufficient sampling information (limited sample data)
NA = No sample data for the given beneficial use (not assessed)
TH = Threatened
* = Waterbody has an EPA approved TMDL

Source Categories and Specific Sources in ATTAINS
Agricultural Crop Production
- Crop Production (Crop Land or Dry Land)
- Irrigated Crop Production
- Non-irrigated Crop Production

Drought-related Impacts
Impacts from Abandoned Mines
- Acid Mine Drainage
- Impacts from Abandoned Mine Lands (Inactive)

Livestock - Grazing or Feeding
- Grazing in Riparian or Shoreline Zones
- Livestock (Grazing or Feeding Operations)
- Rangeland Grazing

Municipal Area or Urban Runoff
- Combined Sewer Overflows
- Municipal (Urbanized High Density Area)
- On-site Treatment Systems (Septic Systems and Similar)
- Residential Districts
- Urban Runoff/Storm Sewers

Natural Sources
Nonpoint Sources
Streambank Modifications/destabilization
Unknown Sources
Wildlife

Bad River Basin (Figure 6, Table 20)

The Bad River basin lies in west-central South Dakota between the Cheyenne and White River basins and drains approximately 3,175 square miles. Historically, a main characteristic of the basin has been a general lack of constant river flow. The upper portion of the Bad River receives water from the Badlands and artesian wells in the Philip area. These wells contribute minimal flow to the upper portion of the Bad River. There are prolonged periods of low or no flow in the Bad River reach from Midland to the Missouri River.

DENR has assessed five lakes within the basin and also has one water quality monitoring site located on the Bad River.

The USGS has water quality monitoring sites on the Bad River, Plum Creek, an unnamed tributary to Cottonwood Creek, and the South Fork Bad River. However, the data are limited, and for most sites, the only parameters that were measured were specific conductance and water temperature.

The Bad River, from the Stanley County line to the mouth, is currently not supporting its warmwater marginal fish life designated use due to exceedances of TSS. A TMDL was approved for TSS in 2001. This reach is also not supporting limited contact recreation use due to *E. coli* exceedances. The Bad River, from its north and south forks to the Stanley County line, has not been assessed. There are no current watershed assessment or implementation projects ongoing in the Bad River Basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

Table 20: Bad River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Freeman Lake	Jackson County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Nitrates	Natural Sources	5*
SD-BA-L-FREEMAN_01					Specific Conductance		
					Total Dissolved Solids		
			Immersion Recreation	NON	Chlorophyll-*a*		
			Limited Contact Recreation	NON	Chlorophyll-*a*		
			Warmwater Permanent Fish Life	NON	Chlorophyll-*a*		
					Oxygen, Dissolved		
					Selenium	Natural Sources	
Hayes Lake	Stanley County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BA-L-HAYES_01			Immersion Recreation	NON	Chlorophyll*a*		
			Limited Contact Recreation	NON	Chlorophyll-*a*		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
Murdo Dam	Jones County	L3	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-BA-L-MURDO_01							
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
					Oxygen, Dissolved		
Sheriff Dam	Jones County (Grasslands)	L4	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BA-L-SHERIFF_01							
Waggoner Lake	Haakon County	L5	Domestic Water Supply	FULL			5
SD-BA-L-WAGGONER_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Bad River	Stanley County line to mouth	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-BA-R-BAD_01							
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	NON	Total Suspended Solids		
Plum Creek	Near and below Hayes, SD	R2	Fish/Wildlife Prop, Rec, Stock	NA			3
SD-BA-R-PLUM_01_USGS			Irrigation Waters	NA			
South Fork Bad River	Near Cottonwood, SD	R3	Fish/Wildlife Prop, Rec, Stock	FULL			2
SD-BA-R-S_FORK_BAD_01_USGS			Irrigation Waters	FULL			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	FULL			
Unnamed tributary of Cottonwood Creek	Near Quinn, SD	R4	Fish/Wildlife Prop, Rec, Stock	NA			3
SD-BA-R-UNNAMED_TRIB_COTTONWOOD_01_USGS			Irrigation Waters	NA			

Bad River Basin

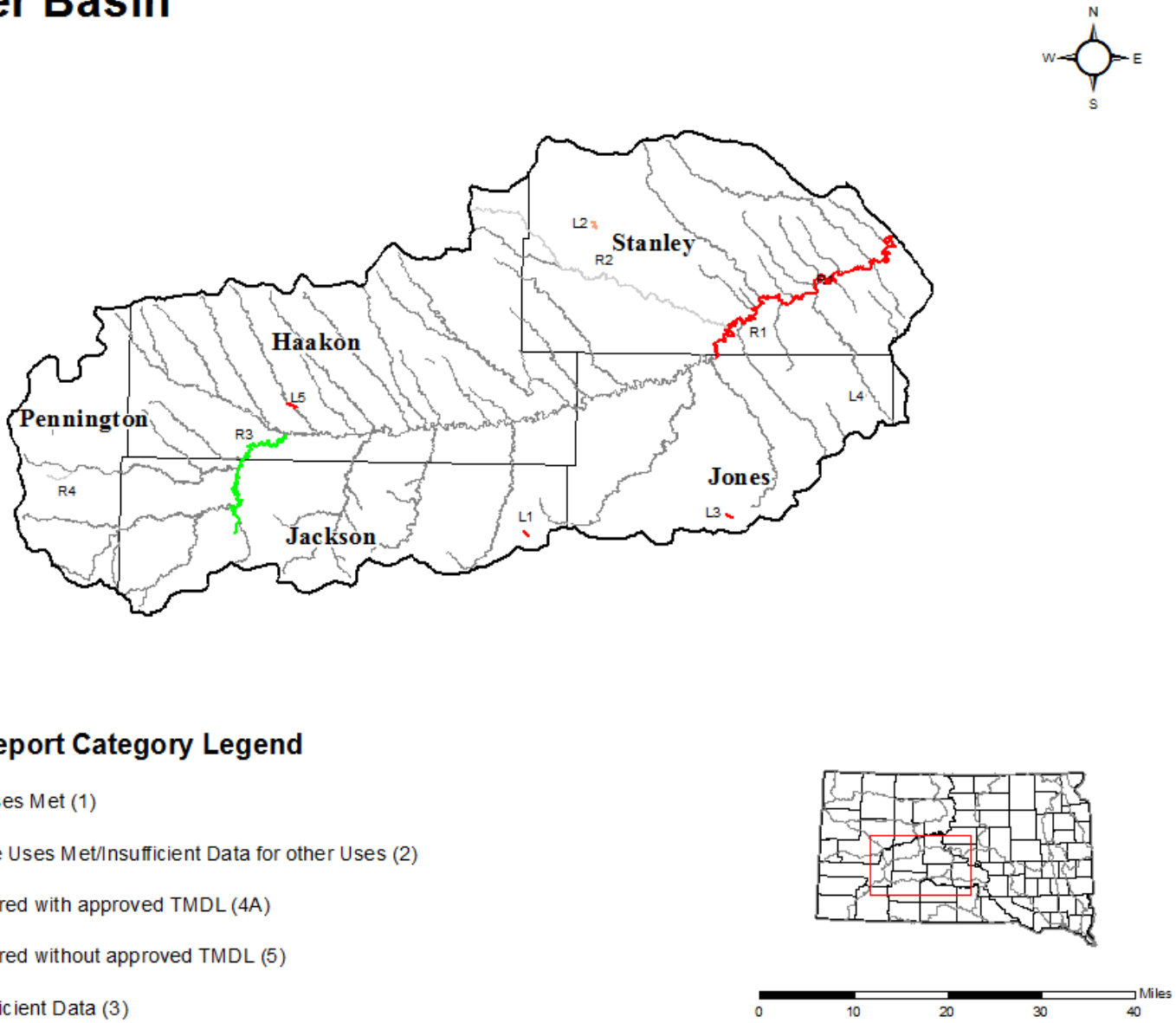


Figure 6: Bad River Basin

Belle Fourche River Basin (Figure 7, Table 21)

The Belle Fourche River basin lies in western South Dakota between the Cheyenne and Moreau River basins and drains approximately 3,271 square miles in South Dakota. The upper portion of the basin contains one active and several historic hard-rock mining operations, several small placer mines, and several large decorative stone and bentonite mines. The middle and lower portions of the basin are mainly used for livestock watering and irrigation.

DENR has assessed six lakes and maintains 22 water quality monitoring sites on many streams within the Belle Fourche basin. Water quality monitoring sites are located on the Belle Fourche River, Spearfish Creek, Whitewood Creek, and various other streams. Most of the streams are routinely monitored for toxic pollutants, such as heavy metals, because a number of hardrock mining operations are or were located in this basin. Available data from DENR watershed assessment projects and sponsors were used to determine waterbody support.

The USGS has water quality monitoring sites on the Belle Fourche River, Crow Creek, Horse Creek, Little Spearfish Creek, Spearfish Creek, and other waterbodies within the basin. The data on some streams are fairly extensive and include information on dissolved oxygen, pH, specific conductance, water temperature, and sodium adsorption ratio. Data collected on all USGS sites were analyzed for this report.

Segment SD-BF-R-MURRAY_DITCH_01_USGS is a reach that is being removed from this 2018 Integrated Report. This reach is monitored by USGS but sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

Strawberry Creek is impacted by historic mining activity and acid mine drainage. One of the contributing sources of impairment was from Brohm Mining Corporation's Gilt Edge Mine. In July 1999, Brohm Mining Corporation's parent corporation, Dakota Mining, declared bankruptcy, and the state of South Dakota took over water treatment. On December 1, 2000, the site was listed on the National Priorities List as a Superfund Site. Remediation activities at Gilt Edge Mine are contracted by EPA to HydroGeoLogic, Inc. Due to remediation activities, copper, low pH, and zinc were delisted as impairment causes in the 2010 cycle. Strawberry Creek continues to be nonsupporting for exceeding chronic cadmium levels. A cadmium TMDL was approved for Strawberry Creek in April 2010.

Several segments of Whitewood Creek near Lead are nonsupporting for *E. coli*. Sources of the high bacteria numbers in the stream's middle reach may be due to aging septic and sewer systems, the combined sewer overflow in Lead, and wildlife and livestock. A SWD permit has been issued to the city of Lead for the combined sewer overflow, requiring compliance with EPA's nine minimum controls for the combined sewer overflow. The city of Lead continues to make progress to separate their sewer systems and ultimately eliminate the combined sewer overflow. TMDLs are currently being developed for the impaired segments of Whitewood Creek.

An implementation project is currently on-going to address water quality of the Belle Fourche River and tributaries. Implementation efforts have primarily focused on irrigation

practices to reduce TSS. Recent emphasis is being placed on grazing management practices to reduce bacteria. The Belle Fourche River continues to remain nonsupporting for TSS; however, a TMDL was approved in 2005. Fecal coliform and *E. coli* TMDLs have been approved for three segments of the Belle Fourche River.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 21: Belle Fourche River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Iron Creek Lake SD-BF-L-IRON_CREEK_01	Lawrence County	L1	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL FULL FULL	Temperature, water		5
Mirror Lake East SD-BF-L-MIRROR_EAST_01	Lawrence County	L2	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL INS INS	Temperature, water		5
Mirror Lake West SD-BF-L-MIRROR_WEST_01	Lawrence County	L3	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL INS INS	Temperature, water		5
Newell Lake SD-BF-L-NEWELL_01	Butte County	L4	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	NON INS INS NON	Mercury in Fish Tissue Mercury in Fish Tissue		4A*
Newell City Pond SD-BF-L-NEWELL_CITY_01	Butte County	L5	Coldwater Marginal Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL FULL FULL	Temperature, water		5
Orman Dam (Belle Fourche Reservoir) SD-BF-L-ORMAN_01	Butte County	L6	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	NON FULL FULL FULL NON	Mercury in Fish Tissue Mercury in Fish Tissue		4A*
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA Category**
Annie Creek SD-BF-R-ANNIE_01	Spearfish Creek to S3, T4N, R2E	R1	Coldwater Marginal Fish Life Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation	FULL FULL FULL FULL			1
Bear Butte Creek SD-BF-R-BEAR_BUTTE_01	Headwaters to Strawberry Creek	R2	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation	FULL FULL FULL FULL			1
Bear Butte Creek SD-BF-R-BEAR_BUTTE_02	Strawberry Creek to S2, T4N, R4E	R3	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation	FULL FULL FULL FULL			1*

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Belle Fourche River	Wyoming border to Redwater		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BF-R-BELLE_FOURCHE_01	River	R4	Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Belle Fourche River	Redwater River to Whitewood		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BF-R-BELLE_FOURCHE_02	Creek	R5	Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Belle Fourche River	Whitewood Creek to Willow		Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-BF-R-BELLE_FOURCHE_03	Creek	R6					
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Belle Fourche River	Willow Creek to Alkali Creek		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BF-R-BELLE_FOURCHE_04		R7	Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Belle Fourche River	Alkali Creek to mouth	R8	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BF-R-BELLE_FOURCHE_05			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Cleopatra Creek	Confluence with East Branch		Coldwater Permanent Fish Life	FULL			1
	Cleopatra Creek to mouth		Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
SD-BF-R-CLEOPATRA_01		R9	Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Crow Creek	S22, T6N, R1E to Redwater River		Coldwater Permanent Fish Life	FULL			2
SD-BF-R-CROW_01_USGS		R10	Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NA			
Deadwood Creek	Rutabaga Gulch to Whitewood		Coldwater Marginal Fish Life	FULL			5
SD-BF-R-DEADWOOD_01	Creek	R11	Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
False Bottom Creek	S26, T5N, R2E to Burno Gulch		Coldwater Marginal Fish Life	FULL			1
SD-BF-R-FALSE_BOTTOM_01	Creek	R12	Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Fantail Creek	Headwaters to Nevada Gulch		Coldwater Permanent Fish Life	FULL			1
SD-BF-R-FANTAIL_01		R13	Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Horse Creek	Indian Creek to mouth	R14	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-BF-R-HORSE_01_USGS			Irrigation Waters	INS			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Little Spearfish Creek	S16, T4N, R1E to Spearfish Creek		Coldwater Permanent Fish Life	FULL			2
SD-BF-R-LITTLE_SPEARFISH_01_USGS		R15	Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NA			
Redwater River	US HWY 85 to mouth	R16	Coldwater Marginal Fish Life	FULL			1
SD-BF-R-REDWATER_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Redwater River	WY border to Hwy 85	R17	Coldwater Permanent Fish Life	INS			3
SD-BF-R-REDWATER_01_USGS			Fish/Wildlife Prop, Rec, Stock	INS			
			Irrigation Waters	INS			
			Limited Contact Recreation	NA			
Spearfish Creek	Intake Gulch to Annie Creek		Coldwater Permanent Fish Life	FULL			1
SD-BF-R-SPEARFISH_01		R18	Commerce & Industry	FULL			
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Spearfish Creek	Annie Creek to McKinley Gulch		Coldwater Permanent Fish Life	FULL			1
SD-BF-R-SPEARFISH_02		R19	Commerce & Industry	FULL			
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			

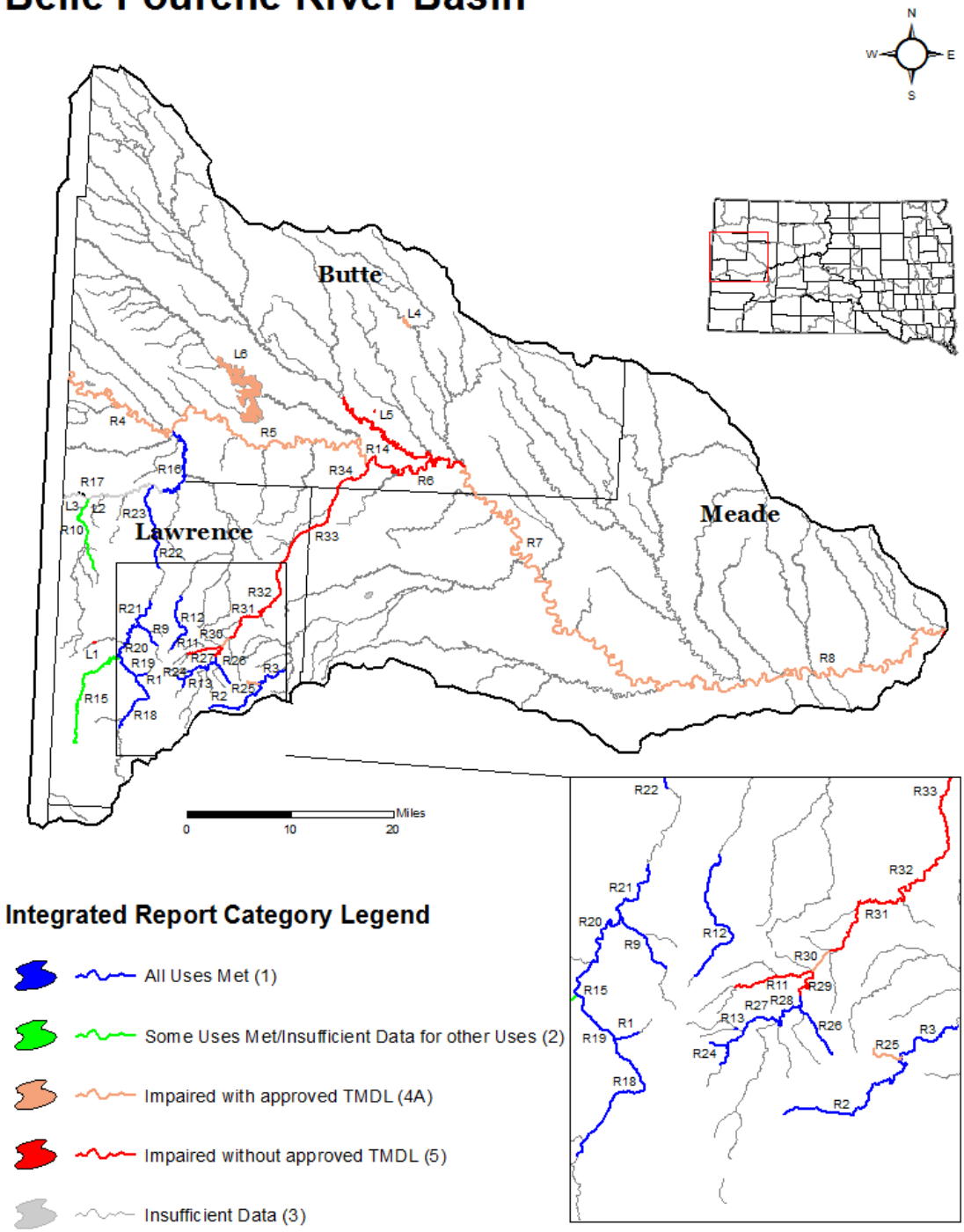
Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Spearfish Creek SD-BF-R-SPEARFISH_03	McKinley Gulch to Cleopatra Creek	R20	Coldwater Permanent Fish Life	FULL			1
			Commerce & Industry	FULL			
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Spearfish Creek SD-BF-R-SPEARFISH_04	Cleopatra Creek to Spearfish City Intake dam in S33, T6N, R2E	R21	Coldwater Permanent Fish Life	FULL			1
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Spearfish Creek SD-BF-R-SPEARFISH_05	Homestake Hydroelectric Plant at Spearfish in S15, T6N, R2E to Higgins Gulch	R22	Coldwater Permanent Fish Life	FULL			1
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Spearfish Creek SD-BF-R-SPEARFISH_06	Higgens Gulch to mouth	R23	Coldwater Permanent Fish Life	FULL			1
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Stewart Gulch SD-BF-R-STEWART_01	Whitetail Creek to NW1/4, NW1/4, S7, T4N, R3E	R24	Coldwater Permanent Fish Life	FULL			1
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Strawberry Creek SD-BF-R-STRAWBERRY_01	Bear Butte Creek to S5, T4N, R4E	R25	Coldwater Marginal Fish Life	NON	Cadmium	Impacts from Abandoned Mine Lands (Inactive) Acid Mine Drainage	4A*
			Fish/Wildlife Prop, Rec, Stock	NON	Cadmium		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
West Strawberry Creek SD-BF-R-W_STRAWBERRY_01	Headwaters to mouth	R26	Coldwater Permanent Fish Life	FULL			1*
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Whitetail Creek SD-BF-R-WHITETAIL_01	Whitewood Creek to S18, T4N, R3E	R27	Coldwater Permanent Fish Life	FULL			1
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Whitewood Creek SD-BF-R-WHITEWOOD_01	Whitetail Summit to Gold Run Creek	R28	Coldwater Permanent Fish Life	FULL			1
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Whitewood Creek SD-BF-R-WHITEWOOD_02	Gold Run Creek to Deadwood Creek	R29	Coldwater Marginal Fish Life	FULL			5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Whitewood Creek SD-BF-R-WHITEWOOD_03	Deadwood Creek to Spruce Gulch	R30	Coldwater Permanent Fish Life	FULL			4A*
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Whitewood Creek SD-BF-R-WHITEWOOD_04	Spruce Gulch to Sandy Creek	R31	Coldwater Marginal Fish Life	FULL			5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Whitewood Creek SD-BF-R-WHITEWOOD_05	Sandy Creek to I-90	R32	Coldwater Marginal Fish Life	NON	pH	Natural Sources	5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Whitewood Creek SD-BF-R-WHITEWOOD_06	I-90 to Crow Creek	R33	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	pH		
Whitewood Creek SD-BF-R-WHITEWOOD_07	Crow Creek to mouth	R34	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		

Belle Fourche River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)

Figure 7: Belle Fourche River Basin

Big Sioux River Basin (Figure 8 and 9, Table 22)

The Big Sioux River basin is located in eastern South Dakota. The lower portion of the river forms the Iowa-South Dakota border. The basin drains an approximate 5,382 square miles in South Dakota and an additional 3,000 square miles in Minnesota and Iowa. The basin's primary source of income is agriculture, but it also contains a majority of the state's light manufacturing, food processing, and wholesale industries. Four state educational institutions, several vocational schools, and Sioux Falls, the state's largest city, are located within this basin, making this the heaviest populated basin in the state.

DENR has assessed 41 lakes and maintains 26 water quality monitoring sites within the Big Sioux basin. Seventeen water quality monitoring sites are located on the Big Sioux River. In addition, available data from DENR watershed assessment projects and project sponsors were used to determine waterbody support. The cities of Watertown, Brookings, and Sioux Falls, the MPCA, and EDWDD also supplied data for waterbodies within the Big Sioux Basin.

The USGS has water quality monitoring sites on the Big Sioux River, Beaver Creek, Flandreau Creek, Skunk Creek, Willow Creek, Hidewood Creek, and Split Rock Creek within the basin. USGS data on the Big Sioux River are fairly extensive and include information on dissolved oxygen, pH, specific conductance, water temperature, and sodium adsorption ratio. Data collected on all USGS sites were analyzed for this report. The cities of Watertown, Brookings, and Sioux Falls and EDWDD supplied water quality data for the Big Sioux River. The city of Sioux Falls and EDWDD also supplied water quality data for Skunk Creek.

SD-BS-R-JACK_MOORE_01 and SD-BS-R-NORTH_DEER_01 are reach segments that have been removed from this 2018 Integrated Report. Reporting for these reaches is being discontinued because no additional monitoring is planned and data is not being supplied from outside organizations. Therefore, DENR does not have sufficient information and is not able to make a support determination. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

A long-term water quality monitoring project is being conducted within the Jensen Creek-Skunk Creek 12 digit hydrologic unit on Skunk Creek (SD-BS-R-SKUNK_01). The monitoring portion of the project is supported by EDWDD and DENR. Monitoring efforts are focused on determining the effectiveness of Seasonal Riparian Area Management (SRAM) implemented at different locations along the stream riparian corridor. The purpose of SRAM is to remove the ability of livestock to access the riparian zone during the recreation season (May 1-September 30). Monitoring sites were established above, below and within the SRAM implementation area. Results of the monitoring effort will be used to examine trends in *Escherichia coli* bacteria, TSS, nutrients, and ecological integrity of the stream in the presence of SRAM. Support for the implementation of SRAM is provided by the City of Sioux Falls and NRCS through the National Water Quality Monitoring Initiative Partnership program. Information gained from this project was used to address nutrient-related narrative standards for SD-BS-R-SKUNK_01.

The main causes of nonsupport within Big Sioux River basin streams continue to be *E. coli* and TSS. The presence of bacteria in the Big Sioux basin is mainly due to runoff from livestock operations, and wet weather discharges and storm sewers within municipal

areas. Sediment sources are overland runoff from nearby croplands, inflow from tributaries, and streambank erosion.

Lakes in the Big Sioux River basin are highly productive due to nutrient enrichment and siltation. Approximately 40% of the monitored lakes are considered hypereutrophic. The moderate size and shallow depth of most lakes contribute to the hypereutrophic conditions. Lakes are susceptible to rapid changes produced by large nutrient and sediment loads from sizeable agricultural watersheds comprised of glacial soils.

Mercury in fish tissue affects many lakes in the Big Sioux River basin. While there are many factors that influence mercury accumulation in fish, a significant factor in this basin is the expansion of water. Water depth, substrate, and increased organic decay influence the rate that elemental mercury is methylated and converted to the biologically available form of methylmercury. The concentration of mercury in the water column is typically very low and similar to other lakes in the basin. However, the methylation rate is typically higher and results in a greater bioavailability of mercury to aquatic life. Twenty-five waterbodies in the Big Sioux Basin are considered nonsupporting the aquatic life uses for mercury in fish tissue. Also, one reach in the Big Sioux River had sufficient data within the specified date range to determine that the reach is nonsupporting. Additional reaches of the Big Sioux River are scheduled to be sampled and support determinations for those reaches will be made in the 2020 IR. A statewide mercury TMDL has been approved by EPA that identifies atmospheric deposition as the primary source of elemental mercury.

Watershed implementation projects within the basin are focused on reducing bacteria, sediment and nutrient loads from both manmade and natural sources. Current implementation projects include the Upper Big Sioux River Implementation project and the Big Sioux River Watershed Implementation project which encompass a large portion of Big Sioux River watershed from the headwaters to the confluence with the Missouri River with the exception of the watershed area between Watertown and Estelline. Implementation efforts being conducted in the upper portion of the basin fall under the Northeast Glacial Lakes Implementation project. Part of the focus of this project is to protect high quality lakes in the region.

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Table 22: Big Sioux River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Lake Albert SD-BS-L-ALBERT_01	Kingsbury County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
					Oxygen, Dissolved		
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
					Oxygen, Dissolved		
Lake Alvin SD-BS-L-ALVIN_01	Lincoln County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			1*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Antelope Lake SD-BS-L-ANTELOPE_01	Clark County	L3	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Bitter Lake SD-BS-L-BITTER_01	Day County	L4	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Blue Dog Lake SD-BS-L-BLUE_DOG_01	Day County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	pH (high)		
Brant Lake SD-BS-L-BRANT_01	Lake County	L6	Fish/Wildlife Prop, Rec, Stock	FULL			1*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Brush Lake SD-BS-L-BRUSH_01	Brookings County	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
Bullhead Lake SD-BS-L-BULLHEAD_01	Deuel County	L8	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
Lake Campbell SD-BS-L-CAMPBELL_01	Brookings County	L9	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Clear Lake SD-BS-L-CLEAR_D_01	Deuel County	L10	Fish/Wildlife Prop, Rec, Stock	FULL			1*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Clear Lake (Hamlin) SD-BS-L-CLEAR_H_01	Hamlin County	L11	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Covell Lake	Minnehaha County	L12	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-BS-L-COVELL_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Diamond Lake	Minnehaha County	L13	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-DIAMOND_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Dry Lake #2	Hamlin	L14	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-DRY_NO2_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Dry Lake	Codington County	L15	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-DRY_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
East Oakwood Lake	Brookings County	L16	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BS-L-E_OAKWOOD_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					pH (high)		
Enemy Swim Lake	Day County	L17	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-ENEMY_SWIM_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Goldsmith Lake	Brookings County	L18	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-GOLDSMITH_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Goose Lake	Codington County	L19	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-GOOSE_01							
Lake Herman	Lake County	L20	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-HERMAN_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
North Island Lake	Minnehaha/McCook counties (formerly SD-VM-L-ISLAND_N_01)	L21	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
SD-BS-L-ISLAND_N_01			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Lake Kampeska	Codington County	L22	Domestic Water Supply	FULL			4A*
SD-BS-L-KAMPESKA_01			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Long Lake SD-BS-L-LONG_COD_01	Codington County	L23	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
Lake Madison SD-BS-L-MADISON_01	Lake County	L24	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
Lake Marsh SD-BS-L-MARSH_01	Hamlin County	L25	Fish/Wildlife Prop, Rec, Stock	INS			3
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	INS			
Minnewasta Lake SD-BS-L-MINNEWASTA_01	Day County	L26	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
Lake Norden SD-BS-L-NORDEN_01	Hamlin County	L27	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Pelican Lake SD-BS-L-PELICAN_01	Codington County	L28	Fish/Wildlife Prop, Rec, Stock	FULL			1*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Pickerel Lake SD-BS-L-PICKEREL_01	Day County	L29	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Lake Poinsett SD-BS-L-POINSETT_01	Hamlin County	L30	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Reid Lake SD-BS-L-REID_01	Clark County	L31	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		

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WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Rush Lake	Day County	L32	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-RUSH_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
School Lake	Deuel County	L33	Fish/Wildlife Prop, Rec, Stock	FULL			1*
SD-BS-L-SCHOOL_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Lake Sinai	Brookings County	L34	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-SINAI_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Lake St. John	Hamlin County	L35	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-BS-L-ST_JOHN_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Swan Lake	Clark County	L36	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-SWAN_01							
Twin Lakes/W. Hwy 81	Kingsbury County	L37	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-TWIN_01							
Twin Lakes	Minnehaha County	L38	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-BS-L-TWIN_02			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
West Oakwood Lake	Brookings County	L39	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BS-L-W_OAKWOOD_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
Wall Lake	Minnehaha County	L40	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-BS-L-WALL_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Waubay Lake	Day County	L41	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-BS-L-WAUBAY_01							
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Beaver Creek	Big Sioux River to S9, T98N, R49W	R1	Fish/Wildlife Prop, Rec, Stock	FULL			1*
SD-BS-R-BEAVER_01			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Beaver Creek	Split Rock Creek to South Dakota-Minnesota border		Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
SD-BS-R-BEAVER_02		R2					
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	NON	Total Suspended Solids		
Big Sioux River	S28, T121N, R52W to Lake Kampeska	R3	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-BS-R-BIG_SIOUX_01			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
					Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved		
Big Sioux River	Lake Kampeska to Willow Creek		Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-BS-R-BIG_SIOUX_02		R4					
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
					Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved		
Big Sioux River	Willow Creek to Stray Horse Creek	R5	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BS-R-BIG_SIOUX_03			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*	Livestock (Grazing or Feeding Operations)	
			Warmwater Semipermanent Fish Life	FULL			
Big Sioux River	Stray Horse Creek to near Volga		Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
SD-BS-R-BIG_SIOUX_04		R6					
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	Near Volga to Brookings	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-BS-R-BIG_SIOUX_05			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	Brookings to Brookings/Moody County Line	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
SD-BS-R-BIG_SIOUX_06							
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Big Sioux River	Brookings/Moody County Line		Domestic Water Supply	FULL			5*
SD-BS-R-BIG_SIOUX_07	to S2, T104N, R49W	R9	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
					Total Suspended Solids		
Big Sioux River	S2, T104N, R49W to I-90	R10	Domestic Water Supply	FULL			4A*
SD-BS-R-BIG_SIOUX_08			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	I-90 to diversion return	R11	Domestic Water Supply	FULL			4A*
SD-BS-R-BIG_SIOUX_10			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*	Municipal (Urbanized High Density Area)	
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	Diversion return to SF WWTF		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
			Immersion Recreation	NON	*Escherichia coli*		
SD-BS-R-BIG_SIOUX_11		R12					
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	SF WWTF to above Brandon		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
			Immersion Recreation	NON	*Escherichia coli*		
SD-BS-R-BIG_SIOUX_12		R13					
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	Above Brandon to Nine Mile		Fish/Wildlife Prop, Rec, Stock	FULL			5*
	Creek	R14	Immersion Recreation	NON	*Escherichia coli*		
SD-BS-R-BIG_SIOUX_13							
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	Nine Mile Creek to near Fairview		Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Immersion Recreation	NON	*Escherichia coli*		
SD-BS-R-BIG_SIOUX_14		R15					
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Big Sioux River	Fairview to near Alcester	R16	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BS-R-BIG_SIOUX_15			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Grazing in Riparian or Shoreline Zones Crop Production (Crop Land or Dry Land)	
Big Sioux River	Near Alcester to Indian Creek		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
			Immersion Recreation	NON	*Escherichia coli*		
SD-BS-R-BIG_SIOUX_16		R17					
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Big Sioux River	Indian Creek to mouth	R18	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BS-R-BIG_SIOUX_17			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Brule Creek	Big Sioux River to confluence of its east and west forks	R19	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
SD-BS-R-BRULE_01							
			Warmwater Marginal Fish Life	NON	TSS		
East Brule Creek	confluence with Brule Creek to S3, T95N, R49W	R20	Fish/Wildlife Prop, Rec, Stock	NA			5*
			Irrigation Waters	NA			
			Limited Contact Recreation	NA			
SD-BS-R-EAST_BRULE_01							
			Warmwater Marginal Fish Life	NON	Total Suspended Solids		
Flandreau Creek	Big Sioux River to Minnesota Border	R21	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
SD-BS-R-FLANDREAU_01							
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Hidewood Creek	Big Sioux River to U.S. Highway 15	R22	Fish/Wildlife Prop, Rec, Stock	INS			3*
			Irrigation Waters	INS			
SD-BS-R-HIDEWOOD_01							
			Limited Contact Recreation	INS			
			Warmwater Marginal Fish Life	INS			
Peg Munky Run	Big Sioux River to S17, T113N, R50W	R23	Fish/Wildlife Prop, Rec, Stock	NA			3*
			Irrigation Waters	NA			
SD-BS-R-PEG_MUNKY_RUN_01							
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NA			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Pipestone Creek	SD/MN border in Minnehaha County to SD/MN border in Moody County	R24	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-BS-R-PIPESTONE_01			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Six Mile Creek	Big Sioux River to S30, T112N, R48W	R25	Fish/Wildlife Prop, Rec, Stock	INS			5
SD-BS-R-SIXMILE_01			Irrigation Waters	INS			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Skunk Creek	Brandt Lake to Big Sioux River	R26	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-BS-R-SKUNK_01			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Split Rock Creek	West Pipestone Creek to Big Sioux River	R27	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-BS-R-SPLIT_ROCK_01_USGS			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	FULL			
Spring Creek	Big Sioux River to S22, T109, R47W	R28	Fish/Wildlife Prop, Rec, Stock	INS			3*
SD-BS-R-SPRING_01			Irrigation Waters	INS			
			Limited Contact Recreation	INS			
			Warmwater Marginal Fish Life	INS			
Stray Horse Creek	Big Sioux River to S26, T116N, R51W	R29	Fish/Wildlife Prop, Rec, Stock	FULL			1*
SD-BS-R-STRAYHORSE_01			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Union Creek	Big Sioux River to confluence with East and West Forks		Fish/Wildlife Prop, Rec, Stock	NA			5*
			Irrigation Waters	NA			
			Limited Contact Recreation	NA			
SD-BS-R-UNION_01		R30					
			Warmwater Marginal Fish Life	NON	Total Suspended Solids		
Willow Creek	Big Sioux River to S7, T117N, R50W	R31	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-BS-R-WILLOW_01			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli* Dissolved oxygen		
			Warmwater Marginal Fish Life	NON	Dissolved oxygen		

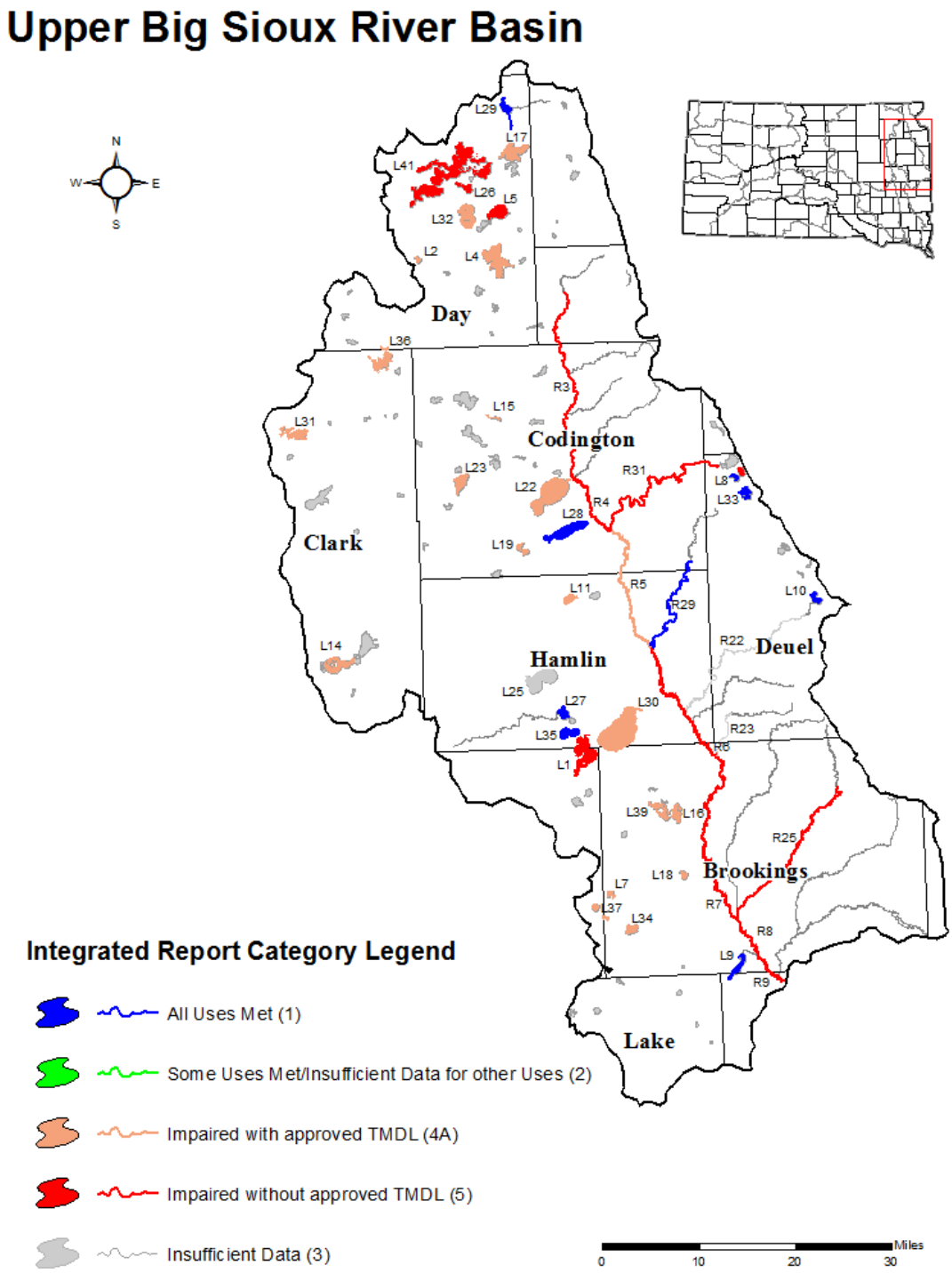

Figure 8: Upper Big Sioux River Basin

Lower Big Sioux River Basin

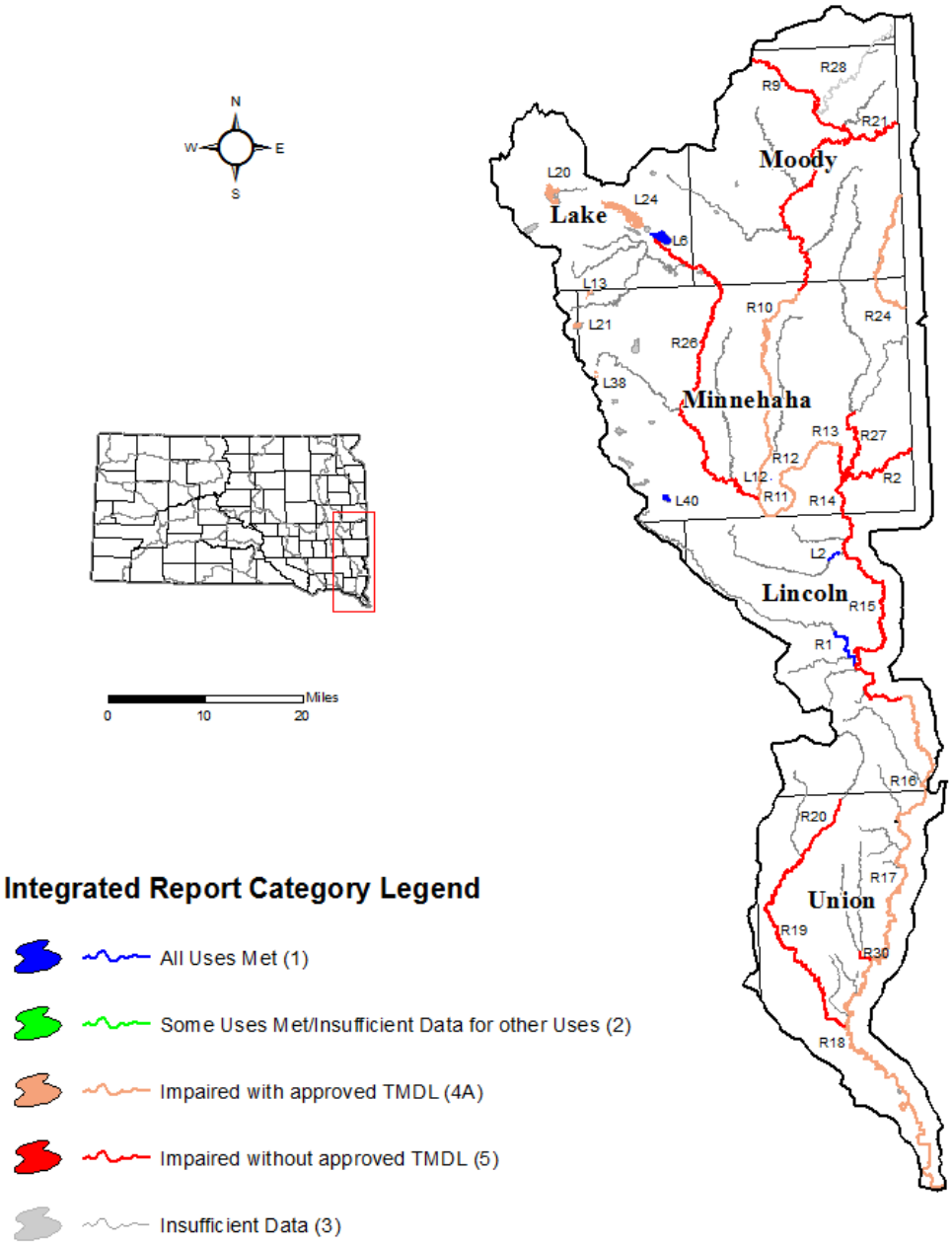

Figure 9: Lower Big Sioux River Basin

Cheyenne River Basin (Figures 10 and 11, Table 23)

The portion of the Cheyenne River basin that lies in southwestern South Dakota drains about 9,732 square miles within the boundaries of the state. The area in this basin is very diverse. It includes part of the Black Hills and Badlands, rangeland, irrigated cropland, and some mining areas. The Cheyenne River originates in Wyoming, flows through the southern Black Hills, and enters Lake Oahe near the center of the state.

DENR has assessed 17 lakes and maintains 34 water quality monitoring sites within the Cheyenne basin. Monitoring sites are located on the Cheyenne River, French Creek, and Rapid Creek. Other monitoring sites are located on various other streams in the basin. In addition, available data from DENR watershed assessment projects and sponsors were also used to determine waterbody support.

Temperature is the primary cause of impairment for lakes in the Cheyenne River basin. All temperature impairments on these lakes are due to exceedances to the temperature criterion for the coldwater permanent fish life beneficial use. TMDL development has not been initiated for any of these lakes; therefore, sources of the temperature impairments have not been identified. In general, ambient air temperature and solar radiation affect water temperature during the peak summer months.

The USGS also maintains a number of water quality monitoring sites located along streams in the Cheyenne River Basin including: Battle Creek, Highland Creek, Rapid Creek, Cheyenne River, and others. The USGS data are limited for most sites and mostly includes specific conductance and water temperature information. Data collected on all USGS sites were analyzed for this report.

Segments SD-CH-R-HAT_01_USGS, SD-CH-R-HOT_BROOK_01, SD-CH-R-RENO_GULCH_01_USGS, and SD-CH-R-SUNDAY_GULCH_01_USGS are reaches that are being removed from this 2018 Integrated Report. Sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

The Cheyenne River basin is home to deposits of natural uranium, historic uranium mining, and current exploration drilling. DENR maintains three water quality monitoring locations within the basin to monitor for uranium and other associated parameters. For this 2018 reporting cycle, there are no exceedances to surface water quality standards for any parameters associated with past uranium mining or current explorations.

The Cheyenne River water quality continues to be generally poor due to both natural and agricultural sources. Most of the Cheyenne River drainage basin contains highly erodible soils. The landscape contributes considerable amounts of eroded sediment during periods of heavy rainfall. During normal or lower flow periods, the upper Cheyenne often exceeds irrigation water quality standards for specific conductance and sodium adsorption ratio. Most segments of the Cheyenne River are nonsupporting for *E. coli* bacteria and TSS. Segments below the Fall River have approved TMDLs for bacteria.

Water quality in Rapid Creek for reaches above Rapid City meets water quality standards for designated beneficial uses. Rapid Creek segments in Rapid City to the Cheyenne River continue to display poor water quality due to excessive *E. coli* bacteria levels.

A sediment removal project was implemented at Horsethief Lake (SD-CH-L-HORSETHIEF_01), Lakota Lake (SD-CH-L-LAKOTA_01) and Bismark Lake (SD-CH-L-BISMARK_01) under direction of the Black Hills National Forest Service in the fall of 2014. The waterbodies were dewatered and the lakebeds were allowed to dry prior to excavation. Sediment removal was completed by the summer of 2015 and the waterbodies were allowed to recharge. Therefore, historic water quality data was not used to determine beneficial use support for each waterbody during the 2018 reporting cycle. All three assessment units were assigned to category 3 (insufficient data/not assessed) until sufficient water quality information is available to make beneficial use support determinations.

No assessment or implementation projects are currently ongoing in the Cheyenne River basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 23: Cheyenne River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Angostura Reservoir	Fall River County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-CH-L-ANGOSTURA_01			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Bismark Lake	Custer County	L2	Coldwater Marginal Fish Life	INS			3
SD-CH-L-BISMARK_01			Fish/Wildlife Prop, Rec, Stock	INS			
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
Canyon Lake	Pennington County	L3	Coldwater Permanent Fish Life	FULL			1
SD-CH-L-CANYON_01			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
Center Lake	Custer County	L4	Coldwater Permanent Fish Life	NON	pH (high)		5*
SD-CH-L-CENTER_01					Temperature, water		
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
Cold Brook Reservoir	Fall River County	L5	Coldwater Permanent Fish Life	NON	Temperature, water		5
SD-CH-L-COLD_BROOK_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
Cottonwood Springs Lake	Fall River County	L6	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-CH-L-COTTONWOOD_SPRINGS_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Crow Reservoir	Fall River County	L7	Fish/Wildlife Prop, Rec, Stock	INS			3
SD-CH-L-CROW_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Semipermanent Fish Life	INS			
Curlew Lake	Meade County	L8	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-CH-L-CURLEW_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Deerfield Lake	Pennington County	L9	Coldwater Permanent Fish Life	NON	Temperature, water		5
SD-CH-L-DEERFIELD_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
Horsethief Lake	Pennington County	L10	Coldwater Permanent Fish Life	INS			3*
SD-CH-L-HORSETHIEF_01			Fish/Wildlife Prop, Rec, Stock	INS			
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
Lakota Lake	Custer County	L11	Coldwater Marginal Fish Life	INS			3
SD-CH-L-LAKOTA_01			Fish/Wildlife Prop, Rec, Stock	INS			
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Legion Lake SD-CH-L-LEGION_01	Custer County	L12	Coldwater Marginal Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL FULL FULL	pH (high)		4A*
New Wall Lake SD-CH-L-NEW_WALL_01	Pennington County	L13	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	NON NA NA NON	Mercury in Fish Tissue pH (high) Mercury in Fish Tissue		5
Pactola Reservoir SD-CH-L-PACTOLA_01	Pennington County	L14	Coldwater Permanent Fish Life Domestic Water Supply Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation	FULL FULL FULL FULL FULL FULL			1
Sheridan Lake SD-CH-L-SHERIDAN_01	Pennington County	L15	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON NON FULL FULL	Mercury in Fish Tissue Oxygen, Dissolved Temperature, water Mercury in Fish Tissue		5*
Stockade Lake SD-CH-L-STOCKADE_01	Custer County	L16	Coldwater Marginal Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON NON FULL FULL	Mercury in Fish Tissue Mercury in Fish Tissue		4A*
Sylvan Lake SD-CH-L-SYLVAN_01	Custer County	L17	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL FULL FULL	pH (high) Temperature, water		5*

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Battle Creek SD-CH-R-BATTLE_01	Near Horsethief Lake to Teepee Gulch Creek	R1	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation	FULL FULL FULL FULL			1
Battle Creek SD-CH-R-BATTLE_01_USGS	Hwy 79 to mouth	R2	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Marginal Fish Life	FULL FULL NON FULL	 *Escherichia coli*		4A*
Battle Creek SD-CH-R-BATTLE_02	Teepee Gulch Creek to SD HWY 79	R3	Coldwater Permanent Fish Life Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation	FULL FULL FULL FULL			1*

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Beaver Creek	WY border to Cheyenne River	R4	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance Total Dissolved Solids		5*
SD-CH-R-BEAVER_01			Irrigation Waters	NON	Salinity (SAR) Specific Conductance		
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Beaver Creek	Near Buffalo Gap	R5	Fish/Wildlife Prop, Rec, Stock	INS			3*
SD-CH-R-BEAVER_01_USGS			Irrigation Waters	INS			
			Limited Contact Recreation	NA			
			Warmwater Permanent Fish Life	INS			
Beaver Creek	S13, T5S, R4E to SD Hwy 79	R6	Coldwater Permanent Fish Life	FULL			2
SD-CH-R-BEAVER_02_USGS			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NA			
Box Elder Creek	Cheyenne River to S22, T2N, R8E	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-CH-R-BOX_ELDER_01			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Box Elder Creek	S16, T2N, R6E to S14, T3N, R4E	R8	Coldwater Permanent Fish Life	FULL			1
SD-CH-R-BOX_ELDER_02			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Castle Creek	Deerfield Reservoir to Rapid Creek	R9	Coldwater Permanent Fish Life	FULL			1
SD-CH-R-CASTLE_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Cherry Creek	Cheyenne River to Sulphur Creek	R10	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-CH-R-CHERRY_01			Irrigation Waters	NON	Specific Conductance		
			Limited Contact Recreation	INS			
			Warmwater Marginal Fish Life	FULL			
Cheyenne River	WY border to Beaver Creek	R11	Fish/Wildlife Prop, Rec, Stock	NON	Total Dissolved Solids		5
SD-CH-R-CHEYENNE_01			Irrigation Waters	NON	Sodium Adsorption Ratio (SAR) Specific Conductance		
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Cheyenne River	Beaver Creek to Cascade Creek	R12	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-CH-R-CHEYENNE_02			Irrigation Waters	NON	Specific Conductance		
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Cheyenne River	Cascade Creek to Angostura Reservoir	R13	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-CH-R-CHEYENNE_02B			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Cheyenne River	Fall River to Cedar Creek		Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-CH-R-CHEYENNE_03		R14	Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Cheyenne River	Cedar Creek to Belle Fourche River		Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-CH-R-CHEYENNE_04		R15	Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources Crop Production (Crop Land or Dry Land)	
Cheyenne River	Belle Fourche River to Bull Creek		Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-CH-R-CHEYENNE_05		R16	Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Cheyenne River	Bull Creek to Lake Oahe		Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-CH-R-CHEYENNE_06		R17	Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Elk Creek	S9, T3N, R7E to S27, T4N, R3E		Coldwater Permanent Fish Life	FULL			5
			Fish/Wildlife Prop, Rec, Stock	FULL			
SD-CH-R-ELK_01_USGS		R18					
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Fall River	Hot Springs to mouth	R19	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-CH-R-FALL_01			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Temperature, water		
Flynn Creek	SF Lame Johnny Creek to S23, T4S, R5E		Coldwater Marginal Fish Life	FULL			1
SD-CH-R-FLYNN_01		R20	Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
French Creek	S23, T3S, R3E to Custer	R21	Coldwater Marginal Fish Life	FULL			1
SD-CH-R-FRENCH_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
French Creek	Custer to Stockade Lake	R22	Coldwater Marginal Fish Life	FULL			1
SD-CH-R-FRENCH_02			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			

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WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
French Creek	Stockade Lake to SD HWY 79		Coldwater Marginal Fish Life	FULL			1
		R23	Fish/Wildlife Prop, Rec, Stock	FULL			
SD-CH-R-FRENCH_03							
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Grace Coolidge Creek	S12, T3S, R5E to Battle Creek		Coldwater Permanent Fish Life	FULL			1
		R24	Fish/Wildlife Prop, Rec, Stock	FULL			
SD-CH-R-GRACE_COOLIDGE_01							
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Grizzly Bear Creek	Near Keystone, SD	R25	Coldwater Permanent Fish Life	FULL			1
SD-CH-R-GRIZZLY_BEAR_01_USGS			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Highland Creek	Wind Cave Natl Park and near Pringle, SD	R26	Coldwater Permanent Fish Life	NON	pH (high) Temperature, water	Natural Sources	5
SD-CH-R-HIGHLAND_01_USGS							
			Fish/Wildlife Prop, Rec, Stock	INS			
			Irrigation Waters	INS			
			Limited Contact Recreation	INS			
Horsehead Creek	At Oelrichs	R27	Fish/Wildlife Prop, Rec, Stock	INS			5
SD-CH-R-HORSEHEAD_01_USGS			Irrigation Waters	NON	Specific Conductance		
			Limited Contact Recreation	INS			
			Warmwater Semipermanent Fish Life	INS			
Iron Creek	From Battle Creek to S33, T2S, R5E	R28	Coldwater Permanent Fish Life	FULL			1
SD-CH-R-IRON_01			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Rapid Creek	Headwaters to Pactola Reservoir		Coldwater Permanent Fish Life	FULL			1
		R29	Domestic Water Supply	FULL			
SD-CH-R-RAPID_01							
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Rapid Creek	Pactola Reservoir to Canyon Lake		Coldwater Permanent Fish Life	FULL			1
		R30	Domestic Water Supply	FULL			
SD-CH-R-RAPID_02							
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Rapid Creek	Canyon Lake to S15, T1N, R8E		Coldwater Permanent Fish Life	FULL			5*
		R31	Domestic Water Supply	FULL			
SD-CH-R-RAPID_03							
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Rapid Creek	S15, T1N, R8E to above	R32	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-CH-R-RAPID_04	Farmingdale		Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Rapid Creek	Above Farmingdale to Cheyenne		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
	River	R33	Immersion Recreation	NON	*Escherichia coli*		
SD-CH-R-RAPID_05							
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
North Fork Rapid Creek	From confluence with Rapid		Coldwater Permanent Fish Life	FULL			1
SD-CH-R-RAPID_N_FORK_01	Creek to S8, T3N, R3E		Fish/Wildlife Prop, Rec, Stock	FULL			
		R34	Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Rhoads Fork	Near Rochford, SD	R35	Coldwater Permanent Fish Life	FULL			1
SD-CH-R-RHOADS_FORK_01_USGS			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Spring Creek	S5, T2S, R3E to Sheridan Lake		Coldwater Permanent Fish Life	FULL			4A*
SD-CH-R-SPRING_01		R36	Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
Spring Creek	Sheridan Lake to SD HWY 79		Coldwater Marginal Fish Life	FULL			1
		R37	Fish/Wildlife Prop, Rec, Stock	FULL			
SD-CH-R-SPRING_02							
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Victoria Creek	Rapid Creek to S19, T1N, R6E		Coldwater Permanent Fish Life	NON	Temperature, water		5
		R38	Fish/Wildlife Prop, Rec, Stock	NA			
SD-CH-R-VICTORIA_01_USGS							
			Irrigation Waters	NA			
			Limited Contact Recreation	NA			

Upper Cheyenne River Basin

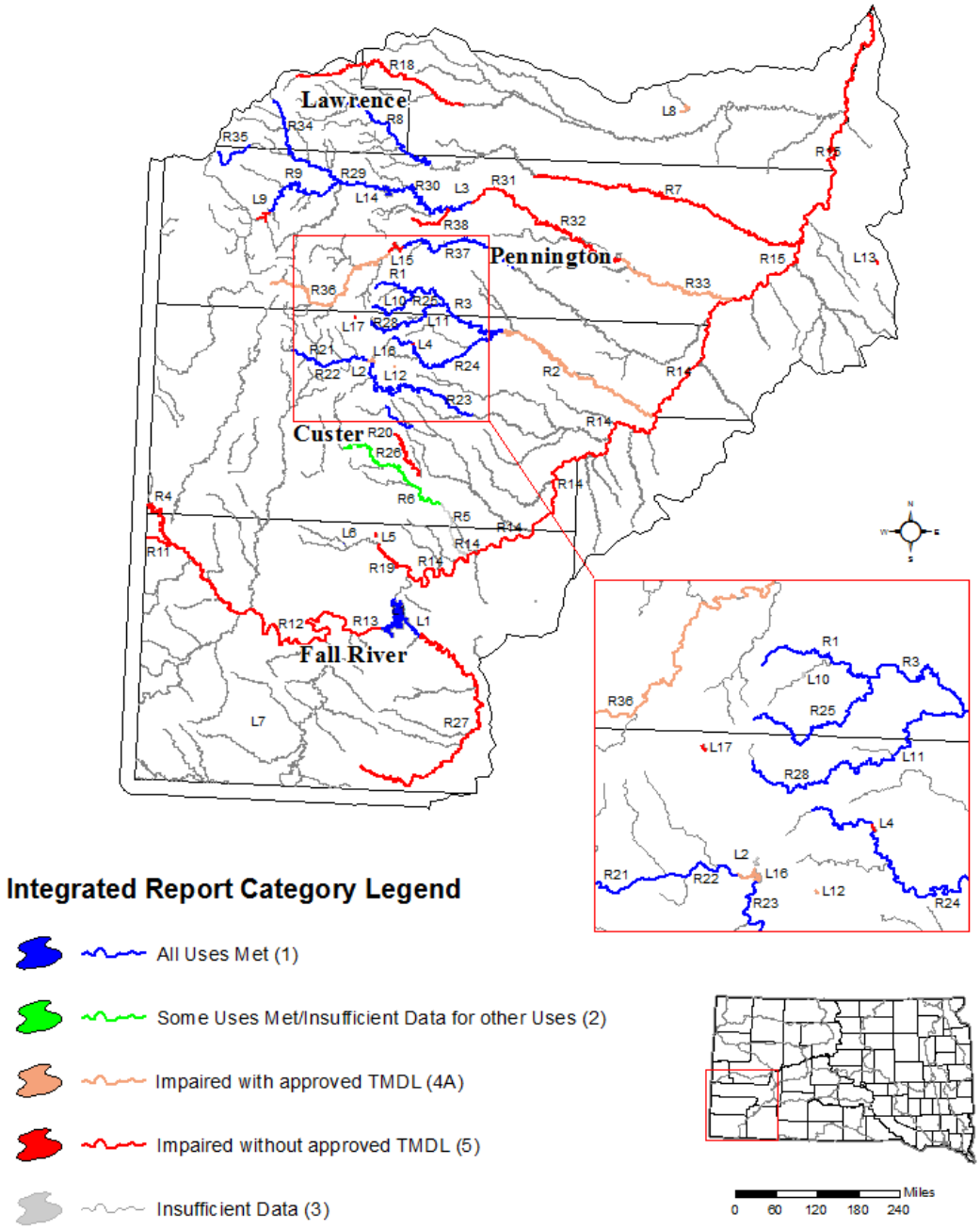


Figure 10: Upper Cheyenne River Basin

Lower Cheyenne River Basin

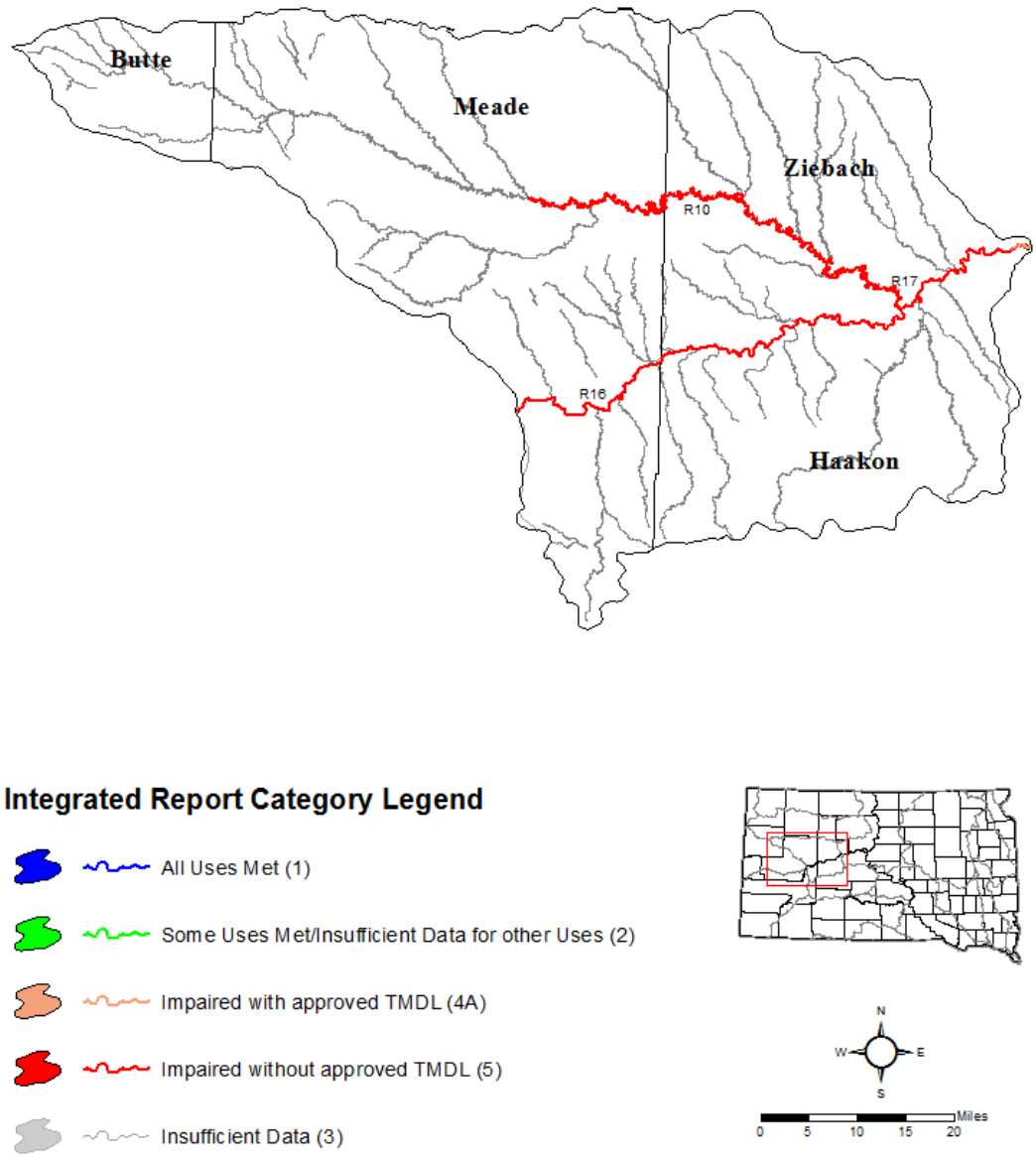


Figure 11: Lower Cheyenne River Basin

Grand River Basin (Figure 12, Table 24)

The Grand River basin covers 4,596 square miles in northwest South Dakota and southwest North Dakota. This is a sparsely populated region with a population density of approximately one person per square mile. The major income is derived from agriculture; however, this basin possesses energy resources in commercial quantities.

DENR has assessed six lakes and maintains nine water quality monitoring sites within the Grand River basin.

The USGS provided data for the Grand River and the North and South Fork Grand Rivers.

Due to historic uranium mining in the Grand River basin, DENR maintains four water quality monitoring sites that are monitored for uranium and other associated parameters. For this reporting cycle, there are no surface water quality exceedances for uranium or other parameters associated with uranium mining.

Elevated specific conductance, TSS, and sodium adsorption ratios (SAR) are typical of the entire basin. The North Fork watershed drains the southern periphery of the North Dakota badlands which may be a major source of high levels of specific conductance and SAR. The South Fork drainage contains erosive soils, which contribute sediment and suspended solids that often produce high TSS and SAR levels in the South Fork.

Shadehill Reservoir and the Grand River are considered impaired for irrigation use due to elevated sodium adsorption ratio (SAR). High sodium concentration, combined with the clay characteristics of most soils in this region, significantly reduce the acres suitable for continuous irrigation. This condition is measured by the SAR. A SAR value of 10 or greater indicates that the buildup of sodium will break down soil structure and cause serious problems for plant growth.

There are no on-going assessment or implementation projects occurring within the basin at this time.

DENR continues discussions with EPA to determine next steps regarding TMDL development and prioritization for the Grand River Basin, since these waters are affected by unique jurisdictional issues. Therefore, TMDL priority and schedule have not been populated in Appendix D.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 24: Grand River Basin Information

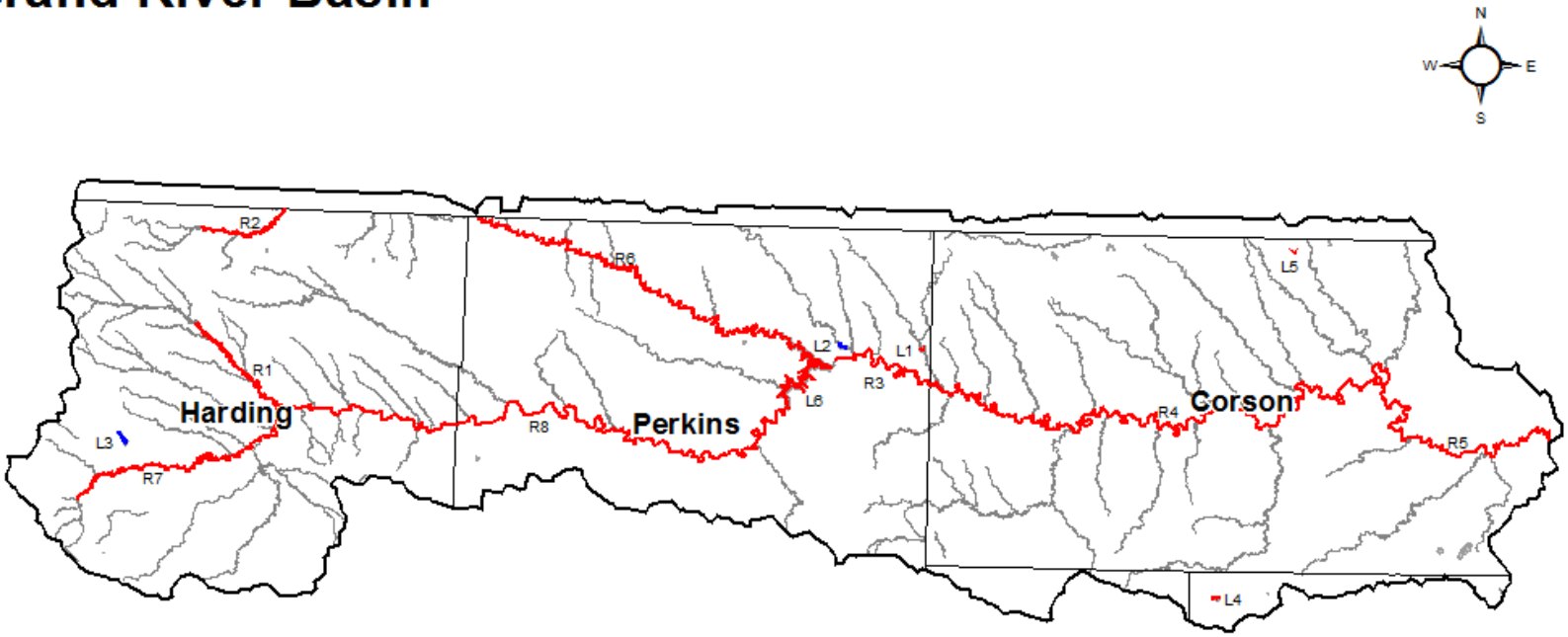
WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
East Lemmon Lake SD-GR-L-EAST_LEMMON_01	Perkins County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5
Flat Creek Dam SD-GR-L-FLAT_CREEK_01	Perkins County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Lake Gardner SD-GR-L-GARDNER_01	Harding County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Lake Isabel SD-GR-L-ISABEL_01	Dewey County	L4	Domestic Water Supply	FULL			5
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
Pudwell Dam SD-GR-L-PUDWELL_01	Corson County	L5	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Shadehill Reservoir SD-GR-L-SHADEHILL_01	Perkins County	L6	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	FULL			
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Bull Creek SD-GR-R-BULL_01	SF Grand River to S15, T21N, R5E	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Crooked Creek SD-GR-R-CROOKED_01	ND border to S34, T23N, R5E	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	NON	Salinity (SAR) Specific Conductance	Natural Sources	
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Grand River SD-GR-R-GRAND_01	Shadehill Reservoir to Corson County line	R3	Coldwater Marginal Fish Life	NON	Temperature, water	Natural Sources	5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

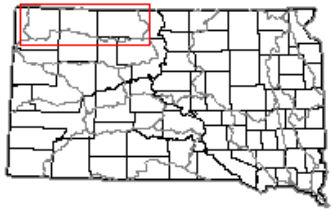
WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Grand River	Corson County line to Bullhead		Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-GR-R-GRAND_02		R4	Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Grand River	Bullhead to mouth	R5	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-GR-R-GRAND_03			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Total Suspended Solids		
Grand River, North Fork	North Dakota border to Shadehill Reservoir	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-GR-R-GRAND_N_FORK_01			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	NON	Salinity (SAR) Specific Conductance	Natural Sources	
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Grand River, South Fork	S13, T18N, R3E to SD Hwy 79		Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-GR-R-GRAND_S_FORK_01		R7					
			Irrigation Waters	NON	Salinity (SAR)		
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources	
Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-GR-R-GRAND_S_FORK_02							
			Immersion Recreation	NON	*Escherichia coli*		
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Natural Sources Grazing in Riparian or Shoreline Zones Crop Production (Crop Land or Dry Land)	

Grand River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)



0 10 20 30 40 Miles

Figure 12: Grand River Basin

James River Basin (Figures 13 and 14, Table 25)

The James River drainage is the second largest river basin in the state. It drains approximately 14,729 square miles, stretching from the North Dakota border to the Missouri River near the Nebraska border. It is located in east-central South Dakota. Agriculture and related businesses are the predominant sources of income.

DENR has assessed 49 lakes and maintains 20 water quality monitoring sites within the James River basin. Eleven monitoring sites are located on the James River. The other sites are located on various other streams in the basin. In addition, available data from DENR watershed assessment projects and sponsors were used to determine waterbody support.

The USGS has several water quality monitoring sites on the James River and other streams in the James River basin including: Elm River, Firesteel Creek, Moccasin Creek, Foot Creek, and several unnamed tributaries in the basin. However, the data are very limited, and for most sites the only parameters that were measured were specific conductance and water temperature.

Segment SD-JA-R-STONYRUN_01_H is a reach that is being removed from this 2018 Integrated Report. Sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

Rosehill Lake (SD-JA-L-ROSEHILL_01) was also removed from this 2018 Integrated Report. The dam breached for a second time in 2011 and GF&P made a decision not to repair the structure. As a result, Rosehill Dam was returned to a free flowing system.

Dissolved oxygen, TSS, and *E. coli* were the main impairments observed within the James River basin during this reporting cycle. Past reporting cycles have also identified these causes of impairment within the James River basin. Substantial organic loading from nonpoint sources throughout the watershed occurs during run-off events. Decaying organic material reduces dissolved oxygen concentration of flood water inundating the flood plain. As water drains back into the river channel, the DO is greatly reduced. Agricultural activities such as livestock operations, grazing in riparian zones, lack of riparian vegetation, and row crop production heavily contribute to the amount of suspended sediments and bacteria in the James River basin.

Mercury in fish tissue affects many lakes in the James River basin. While there are many factors that influence mercury accumulation in fish, a significant factor in this basin is the expansion of water. Water depth, substrate, and increased organic decay influence the rate that elemental mercury is methylated and converted to the biologically available form of methylmercury. The concentration of mercury in the water column is typically very low and similar to other lakes in the basin. However, the methylation rate is typically higher and results in a greater bioavailability of mercury to aquatic life. Twenty-seven waterbodies in the James River Basin are considered nonsupporting the aquatic life uses for mercury in fish tissue. A statewide mercury TMDL has been approved by EPA that identifies atmospheric deposition as the primary source of elemental mercury.

A National Water Quality Monitoring Initiative Partnership project sponsored by NRCS is being conducted on three 12 digit hydrologic unit watersheds of Firesteel Creek. The focus area is the West Branch (101600110804), West Branch and main stem (101600110906) and Storia (101600110905) watersheds. Water quality monitoring was conducted prior to the project and will continue through the project to monitor effectiveness of best management practices. Funding for the project is provided by NRCS and DENR.

The South Central Watershed Implementation Project is also ongoing in the James River basin. This project encompasses the Lower James River watershed south of Huron to the Missouri River, including Lake Mitchell and Firesteel Creek. In addition, the Lewis and Clark Reservoir Watershed (Missouri River basin) has also been included to the project area of the South Central Watershed Implementation Project.

DENR is conducting a special water quality assessment on Firesteel Creek. The goal of the project is to collect baseline bacteria and TSS data at multiple sites along the lower segment (SD-JA-R-FIRESTEEL_01) to address impairment of the designated beneficial uses. Sampling efforts are scheduled to continue during the 2018 field season.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 25: James River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Amsden Dam	Day County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-AMSDEN_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Beaver Lake	Yankton County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-JA-L-BEAVER_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Bierman Dam	Spink County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-JA-L-BIERMAN_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
Bullhead Lake	Marshall County (formerly SD-BS-L-BULLHEAD_02)	L4	Fish/Wildlife Prop, Rec, Stock	NA			3
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
SD-JA-L-BULLHEAD_02							
			Warmwater Semipermanent Fish Life	NA			
Lake Byron	Beadle County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-JA-L-BYRON_01			Immersion Recreation	NA			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NA			
			Warmwater Semipermanent Fish Life	NON	pH (high)		
Lake Carthage	Miner County	L6	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-JA-L-CARTHAGE_01							
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
Cattail Lake	Marshall County (formerly SD-BS-L-CATTAIL_01)	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
SD-JA-L-CATTAIL_01							
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Lake Cavour	Beadle County	L8	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-CAVOUR_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Clear Lake	Marshall County (formerly SD-BS-L-CLEAR_M_01)	L9	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
SD-JA-L-CLEAR_M_01							
			Warmwater Permanent Fish Life	FULL			
Clubhouse Lake	Marshall County	L10	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-CLUBHOUSE_01							
Cottonwood Lake	Spink County	L11	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-COTTONWOOD_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Cottonwood Lake	Marshall County (formerly SD-BS-L-COTTONWOOD_01)		Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
SD-JA-L-COTTONWOOD_M_01		L12					
			Warmwater Semipermanent Fish Life	FULL			
Cresbard Lake	Faulk County	L13	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-JA-L-CRESBARD_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					pH (high)		
Elm Lake	Brown County	L14	Domestic Water Supply	FULL			4A*
SD-JA-L-ELM_01			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Lake Faulkton	Faulk County	L15	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-JA-L-FAULKTON_01			Immersion Recreation	NON	Chlorophyll-a		
					Dissolved oxygen		
			Limited Contact Recreation	NON	Chlorophyll-a		
					Dissolved oxygen		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
					Dissolved oxygen		
Four Mile Lake	Marshall County (formerly SD-BS-L-FOUR_MILE_01)	L16	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
SD-JA-L-FOUR_MILE_01							
			Warmwater Marginal Fish Life	NON	pH (high)		
Lake Hanson	Hanson County	L17	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-HANSON_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Hazeldon Lake	Day County	L18	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-HAZELDON_01							
Henry Reservoir	Near Scotland, SD	L19	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-HENRY_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Horseshoe Lake	Marshall County	L20	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-HORSESHOE_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Jail Pond	Aurora County	L21	Fish/Wildlife Prop, Rec, Stock	FULL			2
SD-JA-L-JAIL_POND_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Marginal Fish Life	FULL			
Jones Lake	Hand County	L22	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-JA-L-JONES_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	pH (high)		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Lardy Lake SD-JA-L-LARDY_01	Day County (formerly SD-BS-L-LARDY_01)	L23	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
Latham Lake SD-JA-L-LATHAM_01	Faulk County	L24	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Immersion Recreation	NON	Oxygen, Dissolved		
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved		
Lilly Lake SD-JA-L-LILY_01	Day County	L25	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
Lake Louise SD-JA-L-LOUISE_01	Hand County	L26	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	NON	Oxygen, Dissolved		
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved pH (high)		
Lynn Lake SD-JA-L-LYNN_01	Day County	L27	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
Menno Lake SD-JA-L-MENNO_01	Hutchinson County	L28	Fish/Wildlife Prop, Rec, Stock	FULL			2
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Semipermanent Fish Life	INS			
Middle Lynn Lake SD-JA-L-MID_LYNN_01	Day County (formerly SD-BS-L-MID_LYNN_01)	L29	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
Mina Lake SD-JA-L-MINA_01	Edmunds County	L30	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	NON	Oxygen, Dissolved		
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue Oxygen, Dissolved		
Lake Mitchell SD-JA-L-MITCHELL_01	Davison County	L31	Domestic Water Supply	NON	Chlorophyll-a		5*
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	NON	Chlorophyll-a		
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a, Temperature		
North Buffalo Lake SD-JA-L-N_BUFFALO_01	Marshall County (formerly SD-BS-L-N_BUFFALO_01)	L32	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Nine Mile Lake SD-JA-L-NINE_MILE_01	Marshall County (formerly SD-BS-L-NINE_MILE_01)	L33	Fish/Wildlife Prop, Rec, Stock	NON	pH (high)		5
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	pH (high)		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
North Scatterwood Lake	Edmunds County	L34	Fish/Wildlife Prop, Rec, Stock	FULL			2
SD-JA-L-NORTH_SCATTERWOOD_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Marginal Fish Life	FULL			
Opitz Lake	Day County	L35	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-OPITZ_01	(formerly SD-BS-L-OPITZ_01						
Pierpont Lake	Day County	L36	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-JA-L-PIERPONT_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Permanent Fish Life	NON	Temperature, water		
Ravine Lake	Beadle County	L37	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-JA-L-RAVINE_01							
			Immersion Recreation	NON	Oxygen, Dissolved		
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
					Oxygen, Dissolved		
Lake Redfield	Spink County	L38	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-JA-L-REDFIELD_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved		
Reetz Lake	Day County	L39	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-REETZ_01							
Richmond Lake	Brown County	L40	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-RICHMOND_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Rosette Lake	Edmunds County	L41	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-JA-L-ROSETTE_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Marginal Fish Life	NON	Chlorophyll-a		
Roy Lake	Marshall County (formerly SD-		Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5
SD-JA-L-ROY_01	BS-L-ROY_01)	L42	Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
South Red Iron Lake	Marshall County (formerly SD-		Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-JA-L-S_RED_IRON_01	BS-L-S_RED_IRON_01)		Immersion Recreation	FULL			
		L43	Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Temperature, water		
South Buffalo Lake	Marshall County (formerly SD-		Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-JA-L-SOUTH_BUFFALO_01	BS-L-SOUTH_BUFFALO_01)						
		L44	Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
					Oxygen, Dissolved		
Staum Dam	Beadle County	L45	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-JA-L-STAUM_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Twin Lakes SD-JA-L-TWIN_01	Sanborn County	L46	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a Oxygen, Dissolved		
Twin Lakes SD-JA-L-TWIN_02	Spink County	L47	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Wilmarth Lake SD-JA-L-WILMARTH_01	Aurora County	L48	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue pH (high)		
Wylie Lake SD-JA-L-WYLIE_01	Brown County	L49	Fish/Wildlife Prop, Rec, Stock	NA			3
			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	NA			

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Dawson Creek SD-JA-R-DAWSON_01	James River to Lake Henry	R1	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Elm River SD-JA-R-ELM_01	Elm Lake to mouth	R2	Domestic Water Supply	NON	Total Dissolved Solids		5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Firesteel Creek SD-JA-R-FIRESTEEL_01	West Fork Firesteel Creek to Mouth	R3	Domestic Water Supply	NON	Total Dissolved Solids		5*
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	NON	Temperature, water Total Suspended Solids		
Foot Creek SD-JA-R-FOOT_01_USGS	Near Aberdeen, SD	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved		

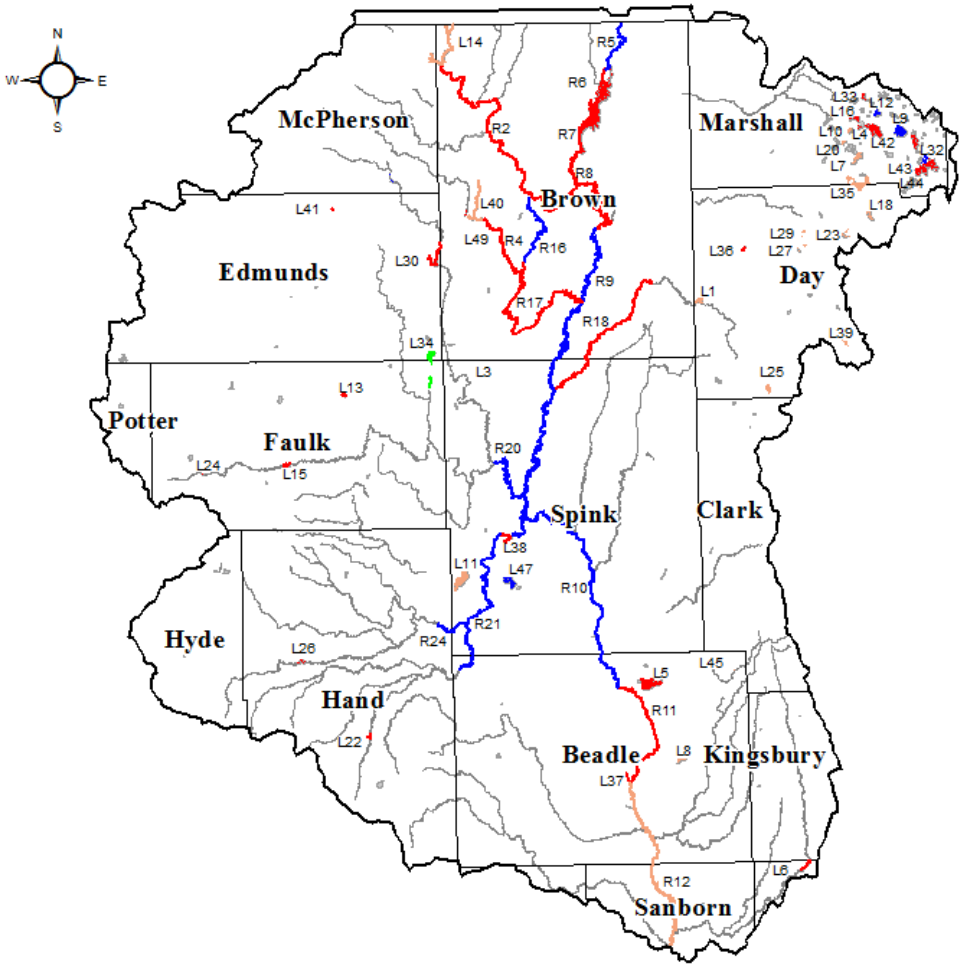
Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
James River SD-JA-R-JAMES_01	North Dakota border to Mud Lake Reservoir	R5	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
James River SD-JA-R-JAMES_02	Mud Lake Reservoir	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
James River SD-JA-R-JAMES_03	Columbia Road Reservoir	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
James River SD-JA-R-JAMES_04	Columbia Road Reservoir to near US HWY 12	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved Total Suspended Solids		
James River SD-JA-R-JAMES_05	US HWY 12 to Mud Creek	R9	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
James River SD-JA-R-JAMES_06	Mud Creek to James River Diversion Dam	R10	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
James River SD-JA-R-JAMES_07	James River Diversion Dam to Huron 3rd Street Dam	R11	Domestic Water Supply	NON	Total Dissolved Solids		5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
James River SD-JA-R-JAMES_08	Huron 3rd Street Dam to Sand Creek	R12	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
James River SD-JA-R-JAMES_09	Sand Creek to I-90	R13	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
James River SD-JA-R-JAMES_10	I-90 to Yankton County line	R14	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
James River SD-JA-R-JAMES_11	Yankton County line to mouth	R15	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Moccasin Creek SD-JA-R-MOCCASIN_01	S24, T123N, R64W to headwaters	R16	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
Moccasin Creek SD-JA-R-MOCCASIN_02	James River to S24, T123N, R64W	R17	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Mud Creek SD-JA-R-MUD_01	James River to Hwy 37	R18	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Marginal Fish Life	FULL			
Pierre Creek SD-JA-R-PIERRE_01	James River to S11, T102N, R58W	R19	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	FULL			
Snake Creek SD-JA-R-SNAKE_01	James River to confluence with SF Snake Creek	R20	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Turtle Creek SD-JA-R-TURTLE_01	James River to S17, T113N, R65W	R21	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Wolf Creek SD-JA-R-WOLF_01	Wolf Creek Colony to S5, T103N, R56W	R22	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Wolf Creek SD-JA-R-WOLF_02	Just above Wolf Creek Colony to the mouth.	R23	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
Wolf Creek SD-JA-R-WOLF_SP_01	Turtle Creek to S10, T114N, R66W	R24	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			

Upper James River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)

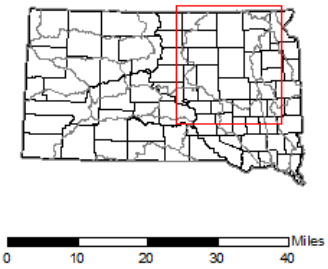


Figure 13: Upper James River Basin

Lower James River Basin

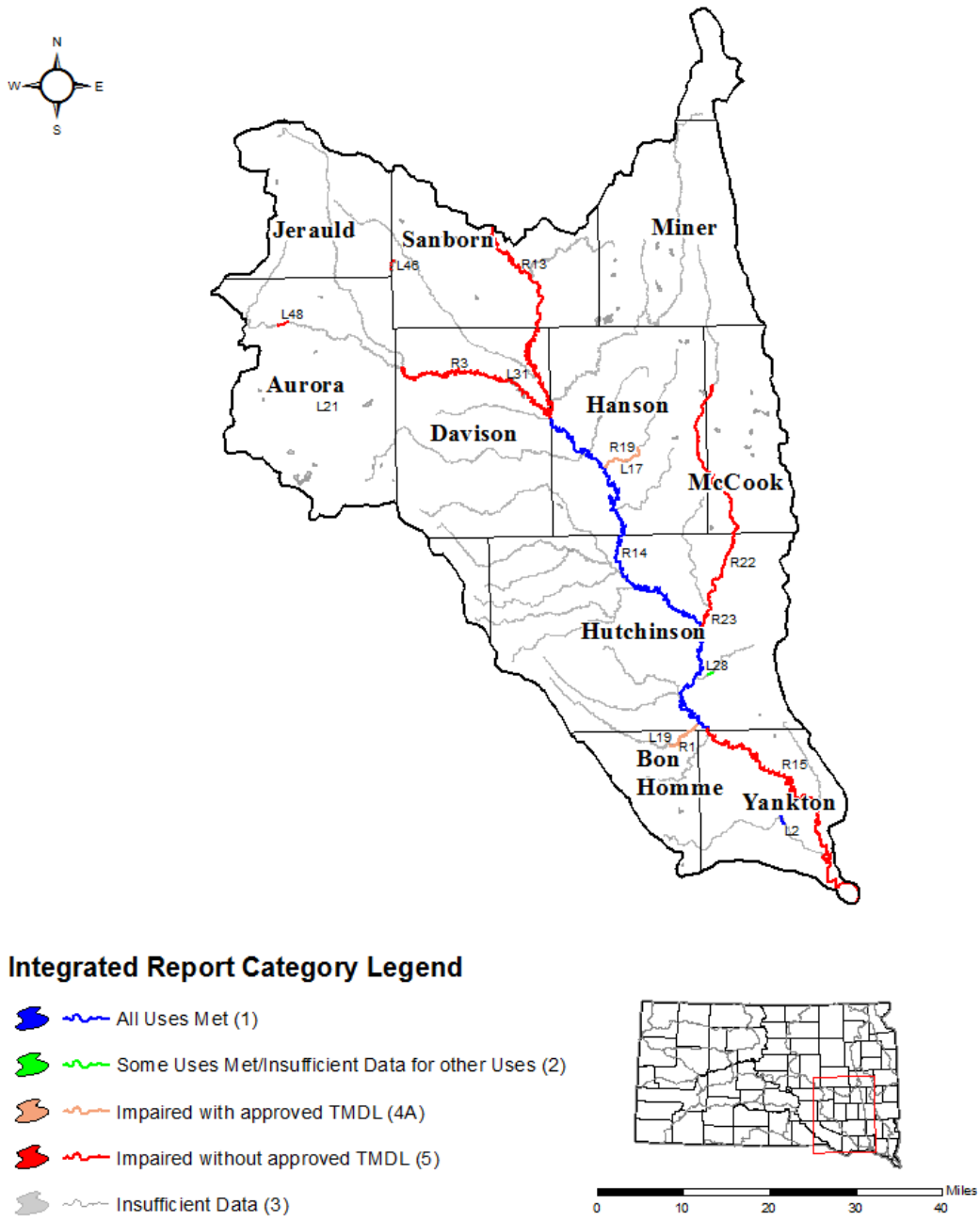


Figure 14: Lower James River Basin

Little Missouri River Basin (Figure 15, Table 26)

The Little Missouri River basin is a small basin located in the northwestern corner of the state. The river enters the state from southeastern Montana and drains 583 square miles before exiting into North Dakota. The basin's economy is dominated by agriculture with approximately 90% of the land being used for agricultural production. The majority of this land is rangeland due to limited rainfall.

There are no monitored lakes within this basin and DENR has one water quality monitoring station located on the Little Missouri River.

The USGS provided water quality data from a station on the Little Missouri River at Camp Crook.

The Little Missouri River is listed as impaired for TSS. The applicable TSS (acute 158 mg/L) standard assigned to protect the designated use of semipermanent fish life was recognized as inappropriate for the Little Missouri River. DENR conducted a comprehensive assessment at 2 sites on the Little Missouri River during the field seasons of 2013 and 2014. The purpose of the assessment was to gain information necessary to verify impairment or provide direction for a site specific TSS standard change. DENR is currently drafting a standards change document with recommendations for increasing the TSS standard on the Little Missouri River. Measures of biotic integrity are an important component of the TSS standard change recommendations. There are currently no formal watershed assessment or implementation projects in the basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 26: Little Missouri River Basin Information

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Little Missouri River SD-LM-R-LITTLE_MISSOURI_01	Montana border to North Dakota border	R1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue Total Suspended Solids		

Little Missouri River Basin

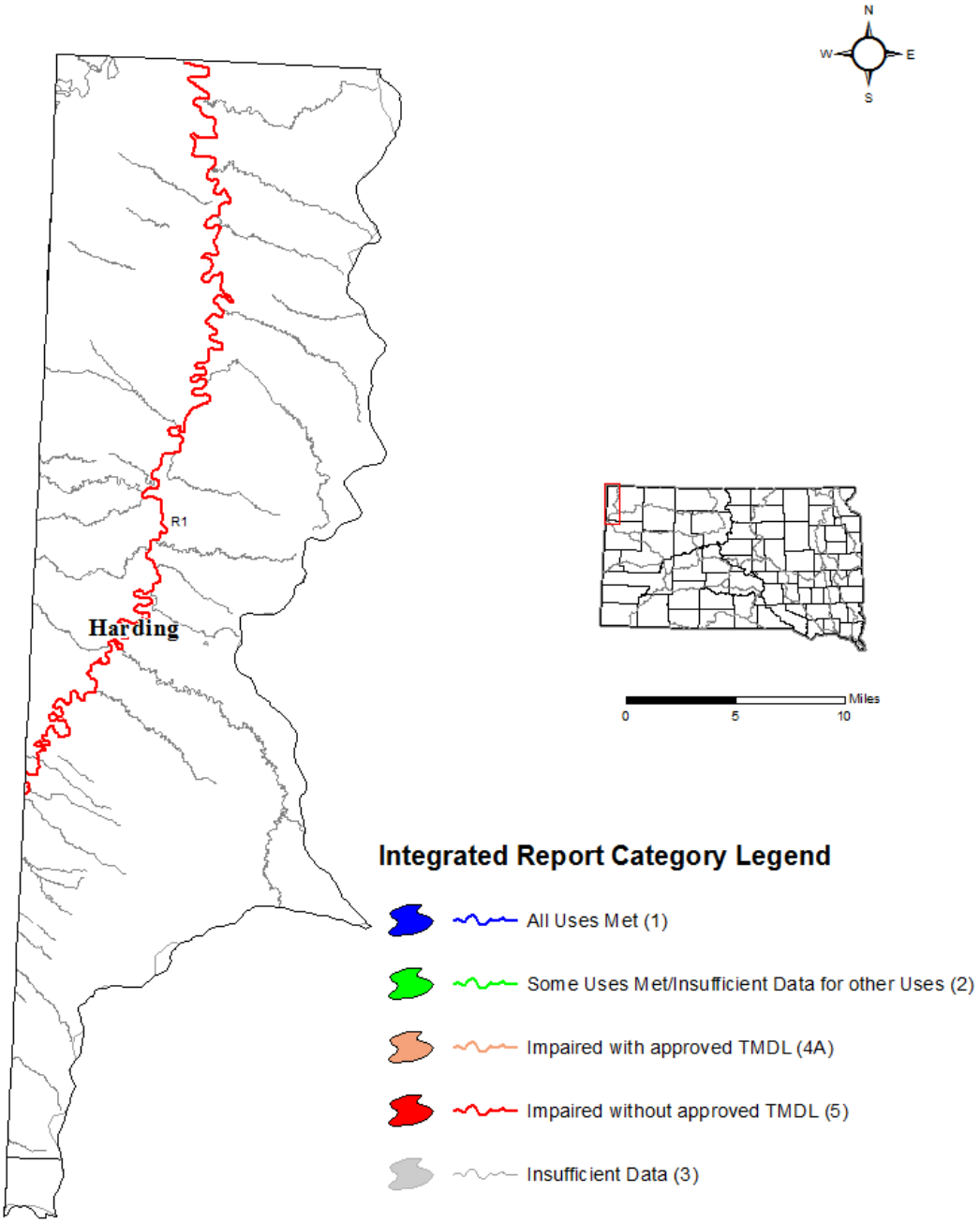


Figure 15: Little Missouri River Basin

Minnesota River Basin (Figure 16, Table 27)

The Minnesota River basin is found in the northeastern corner of the state. The basin is bordered on the north by the Red River tributaries, on the west by the Prairie Coteau Pothole region, on the south by the Big Sioux River, and on the east by the South Dakota/Minnesota border. The basin drains an area of 1,637 square miles within South Dakota.

DENR has assessed eleven lakes and maintains ten water quality monitoring sites within the Minnesota basin. EDWDD also submitted data for waterbodies with the Minnesota River basin. Most stream impairments are due to bacteria, while lake impairments were due to mercury in fish tissue, pH and temperature.

Implementation efforts are currently ongoing in the Upper Minnesota River basin in Grant and Roberts counties with focus on the Whetstone and Yellow Bank watersheds. Coordination was included as part of the Northeast Glacial Lakes project that currently encompasses Day and Marshall Counties.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 27: Minnesota River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Lake Alice	Deuel County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-MN-L-ALICE_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Big Stone Lake	Roberts County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MN-L-BIG_STONE_01			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Temperature, water		
Lake Cochrane	Deuel County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-MN-L-COCHRANE_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	FULL			
Lake Drywood North	Roberts County (formerly SD-BS-L-DRYWOOD_NORTH_01)		Fish/Wildlife Prop, Rec, Stock	INS			3
			Immersion Recreation	NA			
		L4	Limited Contact Recreation	NA			
SD-MN-L-DRYWOOD_NORTH_01			Warmwater Marginal Fish Life	INS			
Fish Lake	Deuel County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			1*
SD-MN-L-FISH_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Lake Hendricks	Brookings County	L6	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MN-L-HENDRICKS_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	pH (high)		
Oak Lake	Brookings County	L7	Fish/Wildlife Prop, Rec, Stock	INS			2
SD-MN-L-OAK_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	INS			
Lake Oliver	Deuel County	L8	Fish/Wildlife Prop, Rec, Stock	FULL			1*
SD-MN-L-OLIVER_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Punished Woman Lake	Codington County	L9	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MN-L-PUNISHED_WOMAN_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	pH (high)		
Summit Lake	Grant County	L10	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-MN-L-SUMMIT_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Turtle Foot Lake	Marshall County	L11	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-MN-L-TURTLE_FOOT_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Lac Qui Parle River, West Branch SD-MN-R-LAC_QUI_PARLE_W_BR_01	SD/MN border to S8, T115N, R47W	R1	Coldwater Marginal Fish Life	FULL			5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
Little Minnesota River SD-MN-R-LITTLE_MINNESOTA_01	Big Stone Lake to S24, T126N, R51W	R2	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Little Minnesota River SD-MN-R-LITTLE_MINNESOTA_02	S24, T126N, R51W to S15, T128N, R52W	R3	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Mud Creek SD-MN-R-MUD_01	SF Yellowbank River to S22, T118N, R48W	R4	Fish/Wildlife Prop, Rec, Stock	NA			5
			Irrigation Waters	NA			
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved		
Whetstone River SD-MN-R-WHETSTONE_01	SD/MN border to confluence with its north and south forks	R5	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
South Fork Whetstone River SD-MN-R-WHETSTONE_S_FORK_01	Headwaters to Lake Farley	R6	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
South Fork Whetstone River SD-MN-R-WHETSTONE_S_FORK_02	Lake Farley to mouth	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
North Fork Yellow Bank River SD-MN-R-YELLOW_BANK_N_FORK_01	SD/MN border to S27, T120N, R48W	R8	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Permanent Fish Life	FULL			
South Fork Yellow Bank River SD-MN-R-YELLOW_BANK_S_FORK_01	SD/MN border to S33, T118N, R49W	R9	Coldwater Marginal Fish Life	FULL			5
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		

Minnesota River Basin

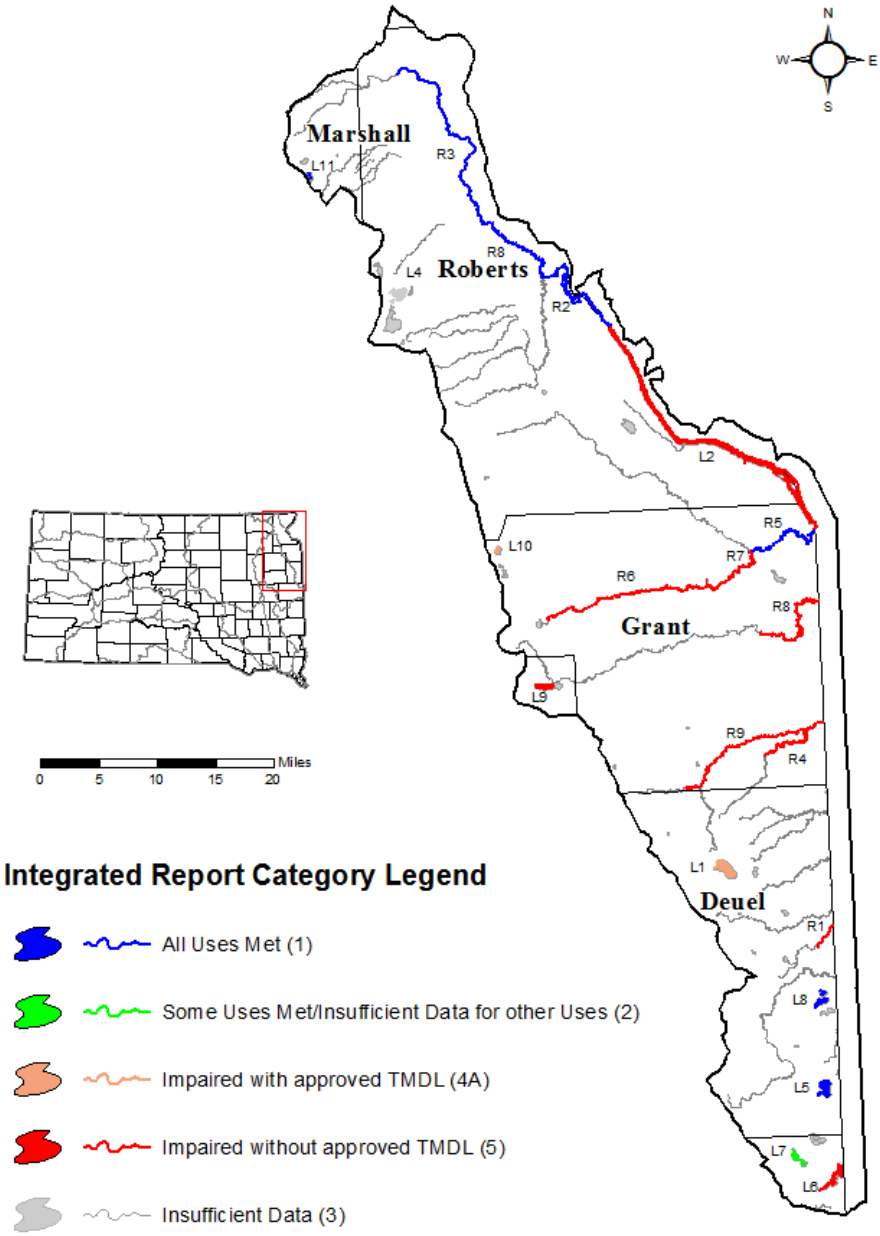


Figure 16: Minnesota River Basin

Missouri River Basin (Figures 17 and 18, Table 28)

The Missouri River is the largest body of water in South Dakota. It flows through the middle of the state to form what is commonly referred to as either “east” or “west” river. The river enters the state on the north from North Dakota and flows south until it reaches the vicinity of Pierre. Along this southern course it receives significant flows from the Grand, Moreau, and Cheyenne River basins. From Pierre, the river flows generally east-southeast until it exits the state on the southeast tip after receiving contributing flows from the Bad, White, James, Vermillion, Niobrara, and Big Sioux River basins. The Missouri River basin is the largest basin in South Dakota and drains approximately 15,865 square miles.

The dominant feature of the Missouri River in South Dakota is the presence of four impoundments: Lake Oahe at Pierre (Oahe Dam), Lake Sharpe at Fort Thompson (Big Bend Dam), Lake Francis Case at Pickstown (Ft. Randall Dam), and Lewis and Clark Lake at Yankton (Gavins Point Dam). The largest of these reservoirs is Lake Oahe with 22,240,000 acre-feet of storage capacity covering 374,000 acres. The impoundments serve for flood control, hydroelectric generation, irrigation, municipal water use, water-related recreation, and downstream navigation. The 70-mile reach from the Gavins Point Dam to Sioux City, Iowa, is the last major free-flowing segment of the Missouri River in the state.

DENR has assessed 23 lakes and maintains thirteen water quality monitoring stations within the Missouri River basin. USGS also has several water quality sites located on the mainstem of the Missouri River and several tributaries. USGS data on the Missouri River itself are fairly extensive and include data for dissolved oxygen, pH, water temperature, sodium adsorption ratio, alkalinity, sulfate, nitrates, total dissolved solids, ammonia, and chlorides. USACE summary data from the 2016 Report “Water Quality Conditions in the Missouri River Mainstem System” were also used in determining waterbody support on Lake Oahe and Lake Sharpe. Water quality data for Lewis and Clark Lake was provided by NE DEQ and USACE.

Lake Sharpe is listed in the Missouri River basin tables as nonsupporting for the (2) Coldwater permanent fish life propagation beneficial use for not meeting the temperature criterion. USACE profile data summaries and DENR data were used to assess water temperature. During summer months, the temperature criterion is often met in Lake Sharpe immediately downstream of Oahe Dam; however, the water can quickly heat up further downstream. Water in Lake Sharpe is well-mixed due to the short retention time in the reservoir, relative shallowness, and bottom withdrawal from Big Bend Dam. A significant thermocline does not typically develop in Lake Sharpe and by late summer, coldwater habitat is limited to coldwater discharges from Oahe Dam. Profile data collected by DENR and USACE profile data summaries indicate periods of time during summer months when no coldwater habitat exists and none of Lake Sharpe meets coldwater temperature criterion.

A significant temperature-depth gradient occurs on Lake Oahe in the near-dam lacustrine area during summer months. This results in the development of a strong thermocline approximately 20 to 25 meters below the surface. The longitudinal extent of the coldwater habitat is dependent upon pool elevation and thermocline depth. The shallower upper reaches of the reservoir are well-mixed by late summer and do not display significant vertical variations in temperature. However, this area may still provide coldwater habitat based on pool elevation.

USACE profile data summaries were used to assess water temperature and resulting coldwater habitat in Lake Oahe. Thermal profile contour plots measured during the months of May through September 2016, indicate the temperature criterion was met longitudinally during most months throughout most the length of the reservoir within the state boundary. Thermal profile contour plots measured in August 2016 indicate the temperature criterion was met longitudinally from Oahe Dam to near river mile 1190 (Indian Creek). During this time, pool elevation was high and ranged from 1610 to 1612 feet mean sea level (ft-msl).

Segments SD-MI-R-CAMPBELL_01_USGS and SD-MI-R-SLAUGHTER_01 are reaches that have been removed from this 2018 Integrated Report. Sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

Most lakes in the Missouri River Basin are highly eutrophic because of nutrient enrichment and siltation. Agricultural activities are the primary sources of pollution.

There are currently no active assessment projects in the Missouri River Basin. The only active implementation project is in the Lewis and Clark watershed which is incorporated under the South Central Watershed Implementation Project which also encompasses the Lower James River Watershed.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 28: Missouri River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Lake Andes	Charles Mix County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-MI-L-ANDES_01			Immersion Recreation	NON	Oxygen, Dissolved		
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Marginal Fish Life	NON	Oxygen, Dissolved		
					pH (high)		
Brakke Dam	Lyman County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-MI-L-BRAKKE_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
Burke Lake	Gregory County	L3	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-MI-L-BURKE_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Oxygen, Dissolved		
Byre Lake	Lyman County	L4	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-MI-L-BYRE_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
Lake Campbell	Campbell County	L5	Fish/Wildlife Prop, Rec, Stock	NON	pH (high)		5
SD-MI-L-CAMPBELL_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Semipermanent Fish Life	NON	pH (high)		
Corsica Lake	Douglas County	L6	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MI-L-CORSICA_01							
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					pH (high)		
Cottonwood Lake	Sully County	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-MI-L-COTTONWOOD_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Mercury in Fish Tissue		
Dante Lake	Charles Mix County	L8	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MI-L-DANTE_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Oxygen, Dissolved		
					Temperature, water		
Eureka Lake	McPherson County	L9	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-MI-L-EUREKA_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Fairfax Lake	Gregory County	L10	Fish/Wildlife Prop, Rec, Stock	FULL			2
SD-MI-L-FAIRFAX_01			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Semipermanent Fish Life	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Fate Dam	Lyman County	L11	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-MI-L-FATE_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Geddes Lake	Charles Mix County	L12	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-MI-L-GEDDES_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Oxygen, Dissolved		
Lake Hiddenwood	Walworth County	L13	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MI-L-HIDDENWOOD_01			Immersion Recreation	NON	Chlorophyll-a		
					Oxygen, Dissolved		
			Limited Contact Recreation	NON	Chlorophyll-a		
					Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Chlorophyll-a		
					Oxygen, Dissolved		
Lake Hurley	Potter County	L14	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
SD-MI-L-HURLEY_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
McCook Lake	Union County	L15	Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MI-L-MCCOOK_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Temperature, water		
Platte Lake	Charles Mix County	L16	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-MI-L-PLATTE_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Lake Pocasse	Campbell County	L17	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-MI-L-POCASSE_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
Potts Dam	Potter County	L18	Fish/Wildlife Prop, Rec, Stock	FULL			2
SD-MI-L-POTTS_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Semipermanent Fish Life	FULL			
Roosevelt Lake	Tripp County	L19	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
SD-MI-L-ROOSEVELT_01			Immersion Recreation	NON	Oxygen, Dissolved		
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		
Sully Lake	Sully County	L20	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-MI-L-SULLY_01			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Sully Dam	Tripp County	L21	Fish/Wildlife Prop, Rec, Stock	FULL			2
SD-MI-L-SULLY_DAM_01			Immersion Recreation	NA			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	INS			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Swan Lake SD-MI-L-SWAN_01	Walworth County	L22	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Marginal Fish Life	INS NA NA INS			3
Lake Yankton SD-MI-L-YANKTON_01	Yankton County	L23	Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation Warmwater Permanent Fish Life	FULL NA NA FULL			2
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA Category**
Choteau Creek SD-MI-R-CHOTEAU_01	Lewis & Clark Lake to S34, T96N, R63W	R1	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL FULL FULL			1*
Crow Creek SD-MI-R-CROW_01	Bedashosha Lake to Jerauld County line	R2	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL NON NON	 *Escherichia coli* Total Suspended Solids		5
Emanuel Creek SD-MI-R-EMANUEL_01	Lewis and Clark Lake to S20, T94N, R60W	R3	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	INS INS NON FULL	 *Escherichia coli*		4A*
Missouri River (Lake Francis Case) SD-MI-R-FRANCIS_CASE_01	Big Bend Dam to Fort Randall Dam	R4	Commerce & Industry Domestic Water Supply Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	FULL FULL FULL FULL FULL FULL FULL			1
Missouri River (Lewis and Clark Lake) SD-MI-R-LEWIS_AND_CLARK_01	Fort Randall Dam to North Sioux City	R5	Commerce & Industry Domestic Water Supply Fish/Wildlife Prop, Rec, Stock Immersion Recreation Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	FULL FULL FULL FULL FULL FULL FULL			1
Medicine Creek SD-MI-R-MEDICINE_01	Lake Sharpe to US Hwy 83	R6	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Marginal Fish Life	NON NON NON FULL	Total Dissolved Solids Specific Conductance *Escherichia coli*		5*
Medicine Knoll Creek SD-MI-R-MEDICINE_KNOLL_01	Lake Sharpe to confluence with its north and south forks	R7	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Marginal Fish Life	FULL FULL FULL FULL			1

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Missouri River (Lake Oahe)	North Dakota border to Oahe		Coldwater Permanent Fish Life	NON	Mercury in Fish Tissue		4A*
SD-MI-R-OAHE_01	Dam	R8	Commerce & Industry	FULL			
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Oak Creek	S20, T21N, R28E to Oahe		Fish/Wildlife Prop, Rec, Stock	FULL			3
SD-MI-R-OAK_01_USGS		R9	Irrigation Waters	FULL			
			Limited Contact Recreation	NA			
			Warmwater Marginal Fish Life	FULL			
Platte Creek	Near Platte, SD	R10	Fish/Wildlife Prop, Rec, Stock	FULL			1
SD-MI-R-PLATTE_01_USGS			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Ponca Creek	SD/NE border to US Hwy 183		Fish/Wildlife Prop, Rec, Stock	FULL			5*
SD-MI-R-PONCA_01		R11					
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	FULL			
Missouri River (Lake Sharpe)	Oahe Dam to Big Bend Dam		Coldwater Permanent Fish Life	NON	Oxygen, Dissolved		5*
SD-MI-R-SHARPE_01		R12					
					Temperature, water		
			Commerce & Industry	FULL			
			Domestic Water Supply	FULL			
			Fish/Wildlife Prop, Rec, Stock	FULL			
			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
Spring Creek	Lake Pocasse to US HWY 83		Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-MI-R-SPRING_01		R13	Irrigation Waters	FULL			
			Limited Contact Recreation	NON	Oxygen, Dissolved		
			Warmwater Semipermanent Fish Life	NON	Oxygen, Dissolved		

Upper Missouri River Basin

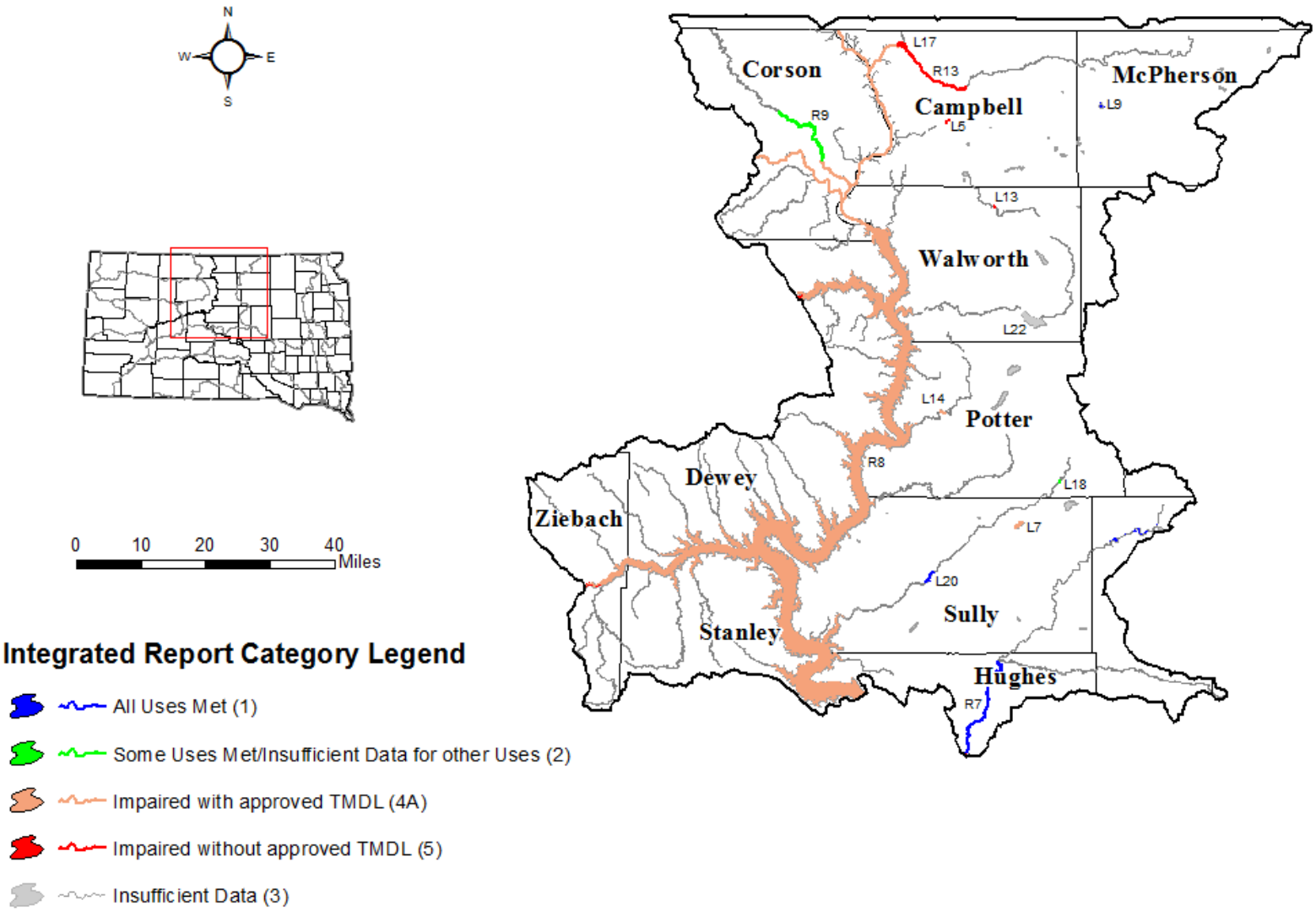


Figure 17: Upper Missouri River Basin

Lower Missouri River Basin

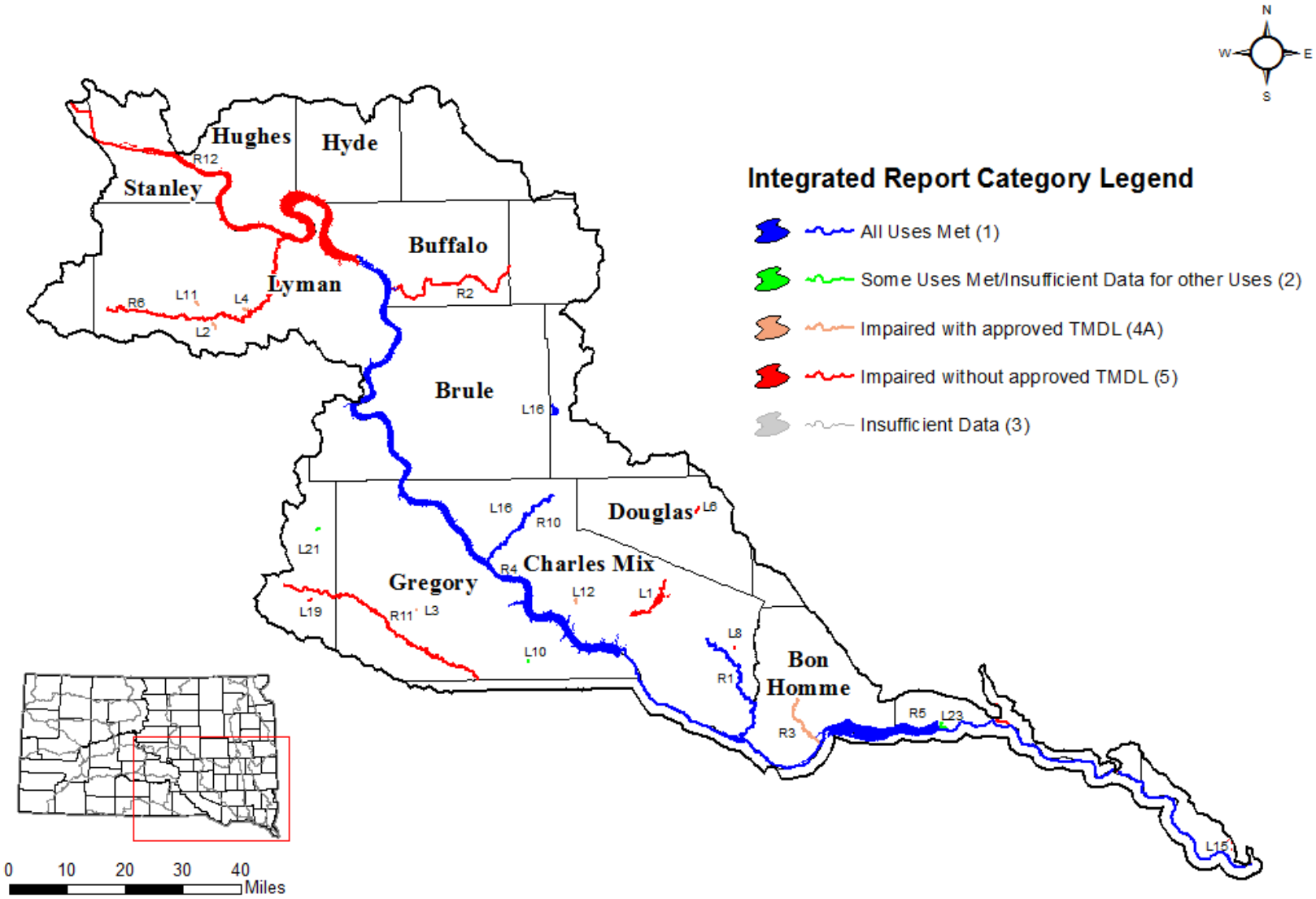


Figure 18: Lower Missouri River Basin

Moreau River Basin (Figure 19, Table 29)

The Moreau River basin is located in the northwest part of South Dakota and drains an area of 4,995 square miles. As with the Grand River basin to the north, agriculture is the mainstay of this sparsely populated basin. Population density is approximately two persons per square mile. A majority of the basin is devoted to ranching operations.

DENR maintains five water quality monitoring sites within this basin. Three monitoring sites are located on the Moreau River, one is located on the South Fork Moreau, and a new site has recently been established on Rabbit Creek.

The USGS has water quality monitoring sites on the Moreau River. The data are limited, and the only parameters measured were specific conductance and water temperature.

Dewberry Dam (SD-MU-L-DEWBERRY_01) was removed from the 2018 Integrated Report following several cycles in category 3 (not assessed). DENR has no further plans to assess Dewberry Dam due to conflicts experienced during past access attempts.

Much of the sediment in the Moreau River basin comes from erosive Cretaceous shales that also mineralize the water. As in the adjoining Grand River basin to the north, this leads to high levels of total dissolved solids in the water of local streams, primarily sulfate, iron, manganese, sodium, and other minerals. Other pollutants in the basin include TSS, SAR, and specific conductance due to natural conditions; and *E. coli* bacteria from livestock and wildlife contributions.

The Moreau River is located downstream from historic uranium mining operations and is monitored for standard parameters and those associated with historic uranium mining. Waterbody support determination for the upper reach of the Moreau River was based on all measured parameters including those associated with uranium mining. As in previous reporting cycles, this reach is listed as not supporting some beneficial use designations based on exceedances of TSS, *E. coli*, and SAR. There were no exceedances for any parameters associated with uranium mining.

There are no on-going assessment or implementation projects occurring within the Moreau basin at this time.

DENR continues discussions with EPA to determine next steps regarding TMDL development and prioritization for the Moreau River Basin, since these waters are affected by unique jurisdictional issues. Therefore, TMDL priority and schedule have not been populated in the basin table or Appendix D.

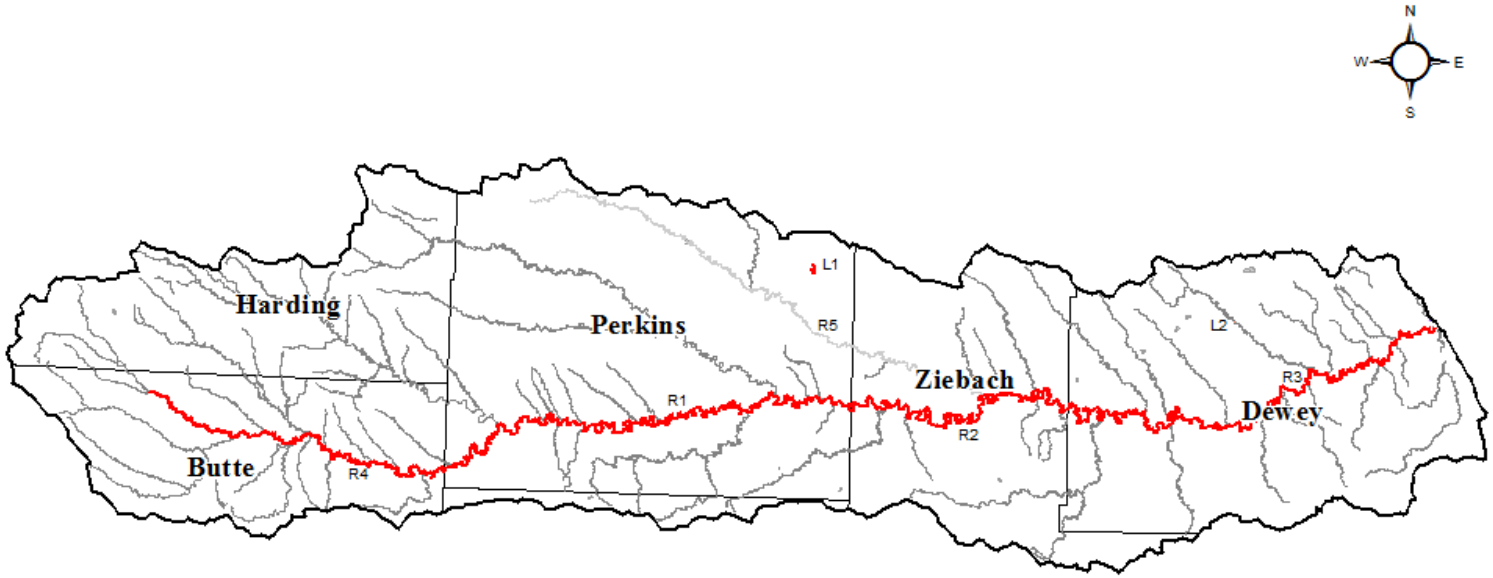
Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 29: Moreau River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Coal Springs Reservoir SD-MU-L-COAL_SPRINGS_01	Perkins County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue pH (high)		5*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue pH (high)		
Little Moreau No. 1 SD-MU-L-LITTLE_MOREAU_NO1_01	Dewey County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Mercury in Fish Tissue		

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Moreau River SD-MU-R-MOREAU_01	North and South Forks to Ziebach/Perkins county line	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Moreau River SD-MU-R-MOREAU_02	Ziebach/Perkins county line to Green Grass	R2	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	NON	Salinity (SAR)	Natural Sources	
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
Moreau River SD-MU-R-MOREAU_03	Green Grass to mouth	R3	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	NON	Salinity (SAR)		
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		
South Fork Moreau River SD-MU-R-MOREAU_S_FORK_01	Alkali Creek to mouth	R4	Fish/Wildlife Prop, Rec, Stock	NON	Specific Conductance Total Dissolved Solids		5
			Irrigation Waters	NON	Sodium Adsorption Ratio (SAR) Specific Conductance		
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
Thunder Butte Creek SD-MU-R-THUNDER_BUTTE_01	Headwaters to mouth	R5	Fish/Wildlife Prop, Rec, Stock	INS			3
			Irrigation Waters	INS			
			Limited Contact Recreation	INS			
			Warmwater Marginal Fish Life	INS			

Moreau River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)

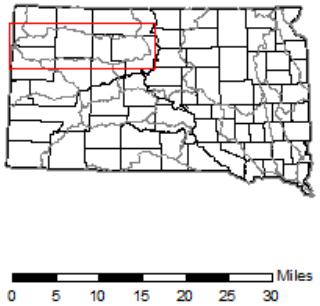


Figure 19: Moreau River Basin

Niobrara River Basin (Figure 20, Table 30)

The tributaries of the Niobrara basin that lie in South Dakota are located in the very south-central part of the state. These tributaries include the Keya Paha River and Minnechaduza Creek. These streams drain approximately 1,742 square miles in South Dakota. Agriculture is the leading source of income to the basin.

DENR has assessed Rahn Dam and maintains one water quality monitoring site on the Keya Paha River. USGS maintains a monitoring site on Antelope Creek, however there is an insufficient amount of data available to determine waterbody support.

The Keya Paha River originates at the confluence with Antelope Creek in the Rosebud Indian Reservation. The river flows in a south-east direction and exits the state east of Wewela, South Dakota. The river is not supporting its designated uses due to TSS and *E. coli* bacteria. Land use along the Keya Paha River is primarily agriculture. Livestock grazing in the riparian or shoreline areas has been identified as the primary source of bacteria. There are no point source discharges to the Keya Paha River. A TMDL has been approved for the Keya Paha River to address the contaminants.

A portion of the Lewis and Clark Watershed (Missouri River Basin) is located in the Niobrara basin. Implementation efforts in the Lewis and Clark Watershed are being conducted under the South Central Watershed Implementation Project which also encompasses the Lower James River Watershed.

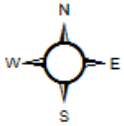
Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A

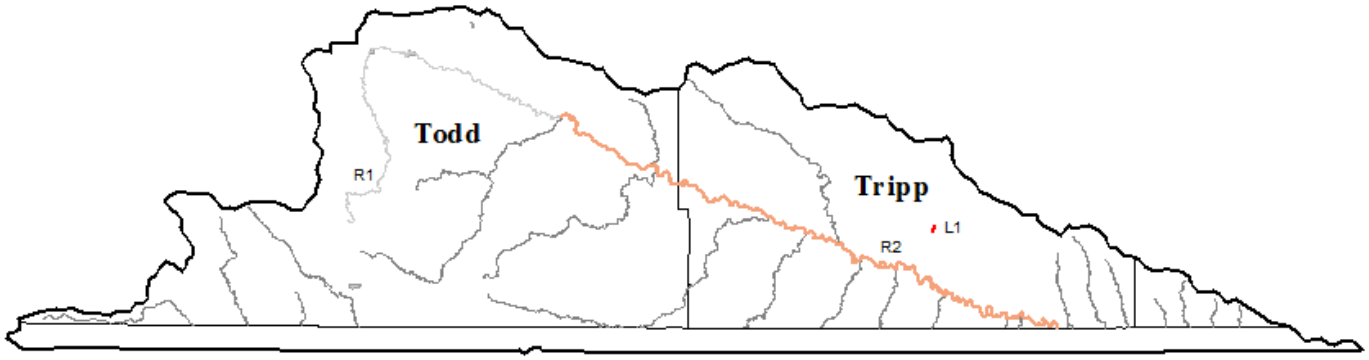
Table 30: Niobrara River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Rahn Lake	Tripp County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-NI-L-RAHN_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Antelope Creek	Near Mission, SD	R1	Fish/Wildlife Prop, Rec, Stock	NA			3
SD-NI-R-ANTELOPE_01_USGS			Irrigation Waters	NA			
			Limited Contact Recreation	NA			
			Warmwater Semipermanent Fish Life	NA			
Keya Paha River	SD/NE border to confluence with		Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-NI-R-KEYA_PAHA_01	Antelope Creek	R2	Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*	Grazing in Riparian or Shoreline Zones	
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids		

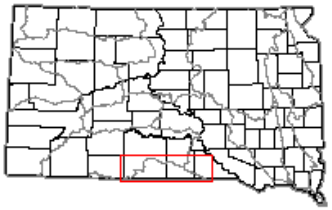
Niobrara River Basin





Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)



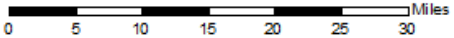


Figure 20: Niobrara River Basin

Red River Basin (Figure 21, Table 31)

The Red River basin covers the extreme northeastern corner of the state. The tributaries of the Red River that are in South Dakota drain a total of 627 square miles. Agriculture is the leading economic industry in the basin.

DENR has assessed two lakes and does not maintain any water quality monitoring sites in the Red River basin.

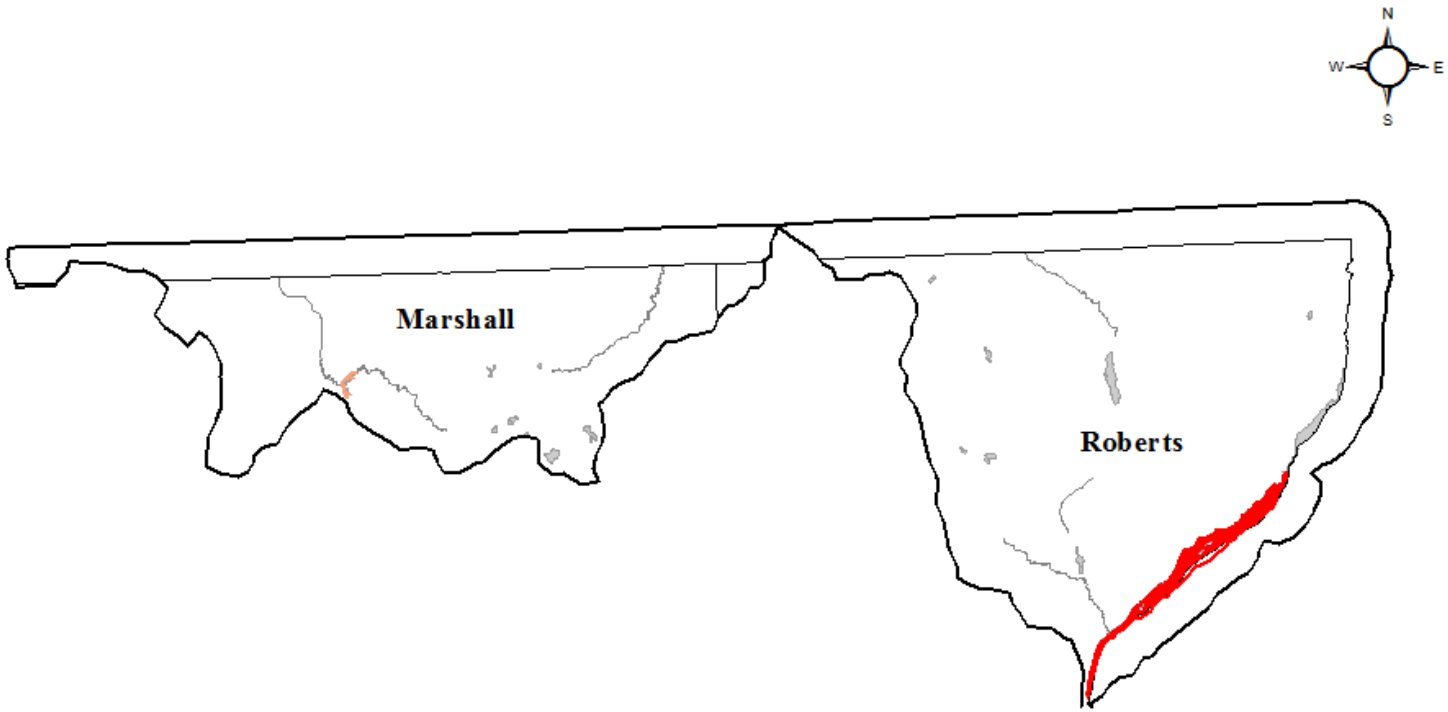
There are no on-going assessment or implementation projects occurring within the Red River basin at this time.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 31: Red River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Lake Traverse	Roberts County	L1	Fish/Wildlife Prop, Rec, Stock	FULL			5
SD-RD-L-TRAVERSE_01			Immersion Recreation	FULL			
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Permanent Fish Life	NON	Temperature, water		
White Lake	Marshall County	L2	Fish/Wildlife Prop, Rec, Stock	FULL			4A*
SD-RD-L-WHITE_01			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		

Red River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)

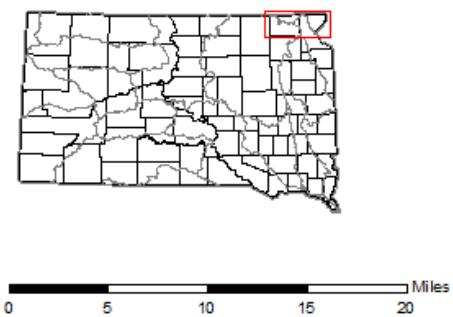


Figure 21: Red River Basin

Vermillion River Basin (Figure 22, Table 32)

The Vermillion River basin covers an area of 2,673 square miles in southeastern South Dakota. The basin is about 150 miles in length and varies in width from 12 miles in the north to 36 miles in the south. Much of the lower 22 miles of the river basin is channelized. Streams in the Vermillion River basin drain to the Vermillion River, which drains to the Missouri River near Vermillion, South Dakota. Agriculture is the leading source of income in the basin. It is estimated that 96% of the total surface area is devoted to agriculture. The remaining areas include municipalities, sand and gravel operations, and other uses.

DENR has assessed seven lakes and maintains six water quality monitoring sites within this basin. Three sites are located on the Vermillion River, two are located on the East Fork Vermillion River, and a new site was recently added on Long Creek.

The USGS has water quality monitoring sites in the basin including sites on the Vermillion River, East Fork Vermillion River, and West Fork Vermillion River. The data are limited and the only parameters measured were specific conductance and water temperature.

Segments SD-VM-R-CAMP_01 and SD-VM-R-LITTLE_VERMILLION_01_USGS are reaches that have been removed from this 2018 Integrated Report. Sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

The upper two reaches of the Vermillion River are fully supporting all designated beneficial uses. The lower reach is nonsupporting due to exceedances of *E. coli* and TSS. Row crops account for approximately 73% land use in the lower segments. Sediment sources are overland runoff from nearby croplands and feedlots, inflow from tributaries, and streambank erosion. There are approved TSS TMDLs for the two lower reaches of the Vermillion River.

A water quality improvement project is planned for a 12 digit hydrologic unit watershed within the impaired segment of the West Fork Vermillion River (SD-VM-R-VERMILLION_WEST_FORK_01_USGS). The project is designed to focus implementation efforts at a smaller scale. Baseline bacteria monitoring has been collected prior to any BMP implementation. Continued monitoring will take place once BMP implementation has occurred to document bacteria reduction within the 12 digit hydrologic unit watershed.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 32: Vermillion River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
East Vermillion Lake SD-VM-L-E_VERMILLION_01	McCook County	L1	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
					Temperature, water		
Lake Henry SD-VM-L-HENRY_01	Kingsbury County	L2	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
					pH (high		
Marindahl Lake SD-VM-L-MARINDAHL_01	Yankton County	L3	Fish/Wildlife Prop, Rec, Stock	INS			3
			Immersion Recreation	INS			
			Limited Contact Recreation	INS			
			Warmwater Permanent Fish Life	INS			
Silver Lake SD-VM-L-SILVER_01	Hutchinson County	L4	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	pH (high)		
Swan Lake SD-VM-L-SWAN_01	Turner County	L5	Fish/Wildlife Prop, Rec, Stock	FULL			1*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Lake Thompson SD-VM-L-THOMPSON_01	Kingsbury County	L6	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		5*
			Immersion Recreation	NON	Chlorophyll-a		
			Limited Contact Recreation	NON	Chlorophyll-a		
			Warmwater Permanent Fish Life	NON	Chlorophyll-a		
					Mercury in Fish Tissue		
Whitewood Lake SD-VM-L-WHITEWOOD_01	Kingsbury County	L7	Fish/Wildlife Prop, Rec, Stock	NON	Mercury in Fish Tissue		4A*
			Immersion Recreation	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	NON	Mercury in Fish Tissue		
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA Category**
Long Creek SD-VM-R-LONG_01	Vermillion River to Hwy 34	R1	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	FULL			

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

WATERBODY Streams/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Vermillion River SD-VM-R-VERMILLION_01	Headwaters to Turkey Ridge Creek	R2	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Vermillion River SD-VM-R-VERMILLION_02	Turkey Ridge Creek to Baptist Creek	R3	Fish/Wildlife Prop, Rec, Stock	FULL			1*
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Semipermanent Fish Life	FULL			
Vermillion River SD-VM-R-VERMILLION_03	Baptist Creek to mouth	R4	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Semipermanent Fish Life	NON	Total Suspended Solids	Livestock (Grazing or Feeding Operations) Grazing in Riparian or Shoreline Zones Crop Production (Crop Land or Dry Land)	
East Fork Vermillion River SD-VM-R-VERMILLION_E_FORK_01	McCook/Lake County line to Little Vermillion River	R5	Fish/Wildlife Prop, Rec, Stock	FULL			5*
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			
East Fork Vermillion River SD-VM-R-VERMILLION_E_FORK_02	Little Vermillion River to mouth	R6	Fish/Wildlife Prop, Rec, Stock	FULL			1
			Irrigation Waters	FULL			
			Limited Contact Recreation	FULL			
			Warmwater Marginal Fish Life	FULL			
West Fork Vermillion River SD-VM-R-VERMILLION_WEST_FORK_01_USGS	Vermillion River to McCook-Miner County Line	R7	Fish/Wildlife Prop, Rec, Stock	FULL			5
			Irrigation Waters	FULL			
			Limited Contact Recreation	NON	*Escherichia coli*		
			Warmwater Marginal Fish Life	FULL			

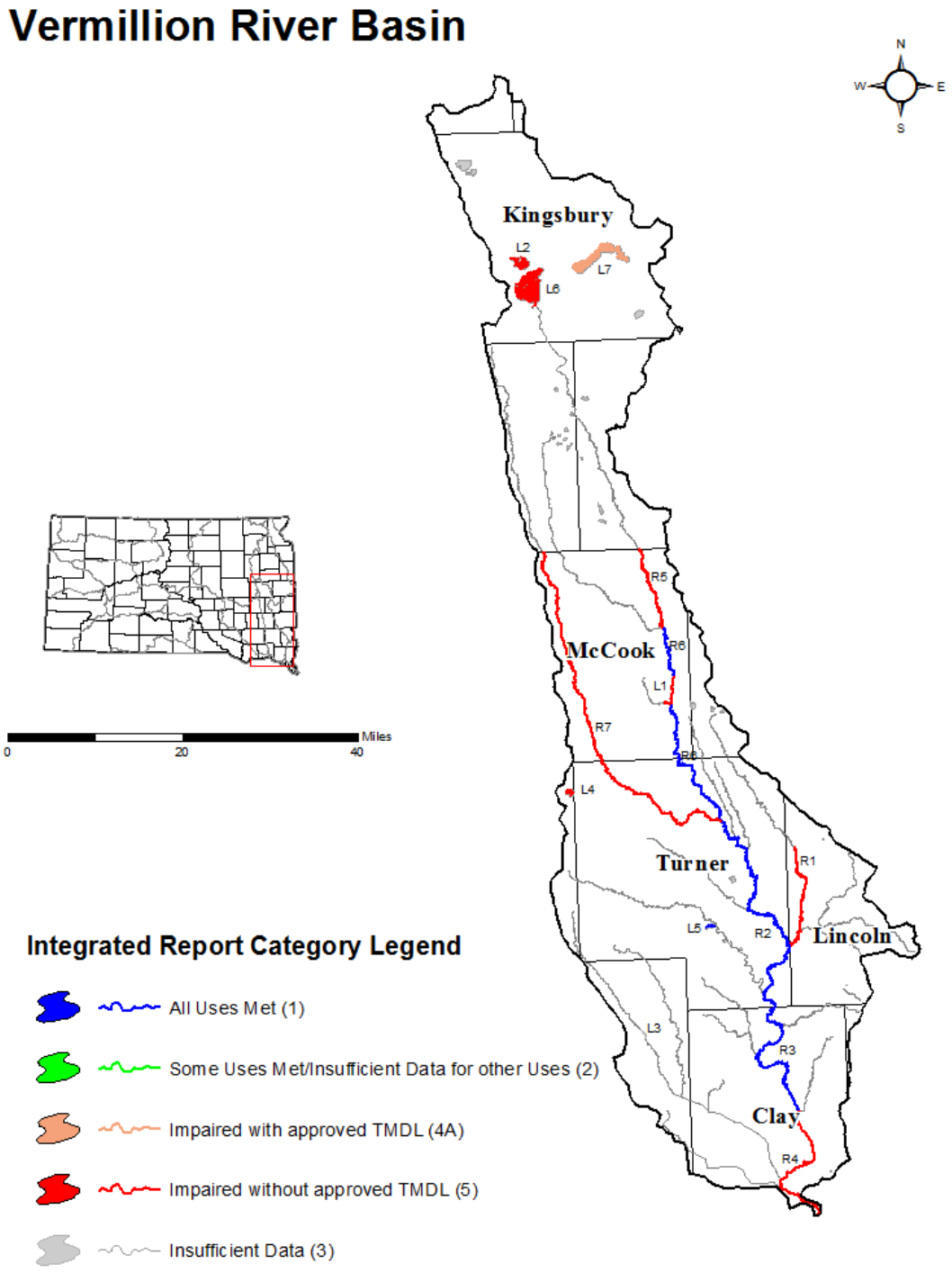


Figure 22: Vermillion River Basin

White River Basin (Figure 23, Table 33)

The White River basin is the most southern of the five major drainages in South Dakota that enters the Missouri River from the west. The total drainage area of the basin in the state is 8,246 square miles. Agriculture dominates the basin's economy, with the majority of the land used as rangeland or cropland.

DENR has assessed one lake in the White River basin and maintains five water quality monitoring sites within this basin. Four monitoring sites are located on the White River and the other is located on the Little White River.

The USGS has water quality monitoring sites in the basin, including sites on the White River, Little White River, Black Pipe Creek, Lake Creek and others. The data are limited, and the only parameters that were measured were specific conductance and water temperature.

Segments SD-WH-R-WHITE_CLAY_01_USGS and SD-MI-WH-R-WOUNDED_KNEE_01_USGS are reaches that have been removed from this 2018 Integrated Report. Sampling has been reduced or discontinued and sufficient data is no longer being collected to make waterbody support determinations. DENR will add waterbody reaches to future reports if routine monitoring data becomes available or is supplied by other organizations.

DENR continues to sample uranium, and other parameters associated with uranium mining, at an ambient monitoring location on the White River near Oglala. This location was selected due to in-situ uranium mining upstream in Nebraska and the naturally occurring uranium in the highly erodible soils in the White River basin. Support determinations were based on all parameters; however, there were no surface water quality exceedances for uranium or other parameters associated with uranium mining.

The White River basin receives the majority of the runoff and drainage from the western Badlands. The exposed Badlands are a major natural source of both suspended and dissolved solids to the river. Severe erosion and leaching of soils occurs in the Badlands and throughout the entire length of the basin. Site specific water quality standards for TSS were established by DENR in 2009 for the White River and Little White River; however, the reach SD-WH-R-WHITE_03 is not meeting the site specific TSS standard during this 2018 Integrated Report cycle. The White River is listed as impaired for SAR, TSS, and *E. coli*.

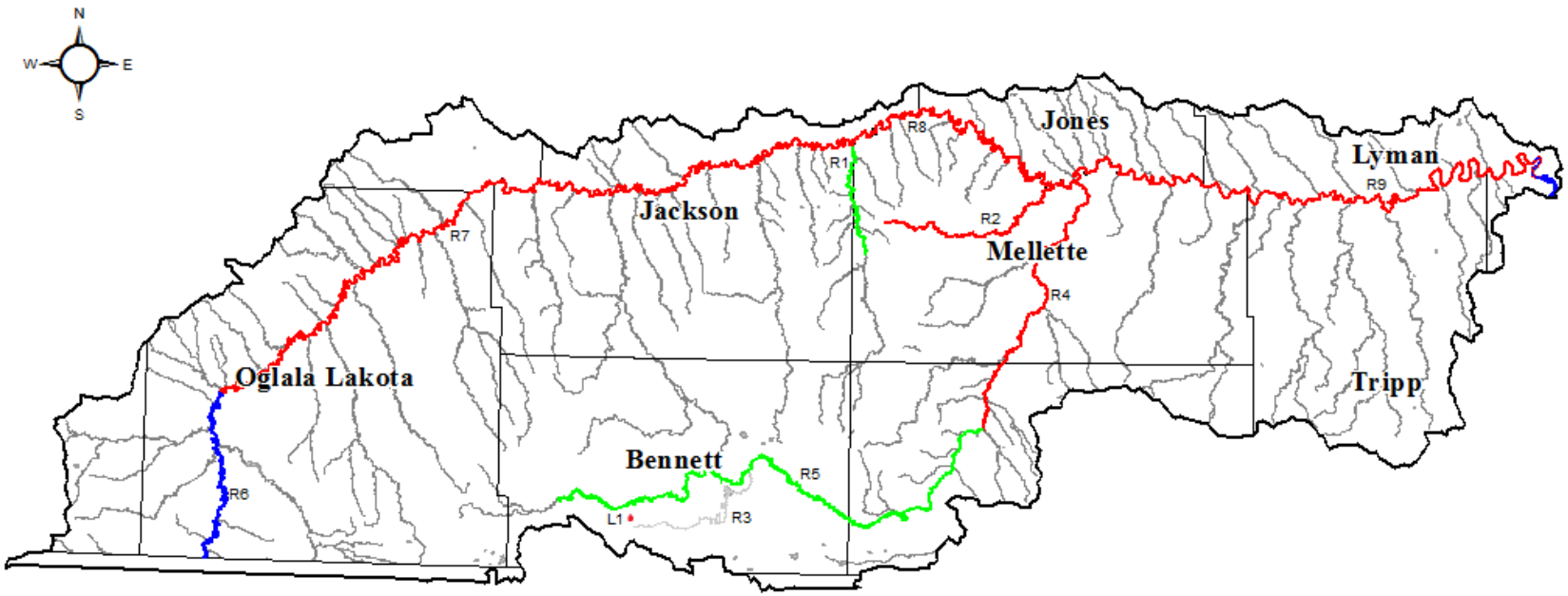
Assessment projects have been completed for the White River, Little White River, and Cottonwood Creek watersheds. There are currently no on-going implementation projects in the White River basin.

Category (1) All uses met; (2) Some uses met but insufficient data to determine support of other uses; (3) Insufficient data; (4A) Water impaired but has an approved TMDL; (5) Water impaired/requires a TMDL. * Waterbody has an EPA approved TMDL, refer to Appendix A.

Table 33: White River Basin Information

WATERBODY Lakes/AUID	LOCATION	MAP ID	USE	SUPPORT	CAUSE	SOURCE	EPA Category
Allan Dam SD-WH-L-ALLAN_DAM_01	Bennett County	L1	Coldwater Marginal Fish Life Fish/Wildlife Prop, Rec, Stock Immersion Recreation Limited Contact Recreation	NON FULL FULL FULL	pH (high)		5
WATERBODY Streams/AUID	**LOCATION**	**MAP ID**	**USE**	**SUPPORT**	**CAUSE**	**SOURCE**	**EPA Category**
Black Pipe Creek SD-WH-R-BLACKPIPE_01_USGS	S25, T42N, R33W to White River	R1	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Marginal Fish Life	FULL FULL NA FULL			2
Cottonwood Creek SD-WH-R-COTTONWOOD_01	Headwaters to White River	R2	Fish/Wildlife Prop, Rec, Stock Irrigation Waters	INS NON	Specific Conductance		5
Lake Creek SD-WH-R-LAKE_01_USGS	Above and below refuge near Tuthill, SD	R3	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Permanent Fish Life	INS INS NA INS			3
Little White River SD-WH-R-LITTLE_WHITE_01	Rosebud Creek to mouth	R4	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL NON FULL	*Escherichia coli*		5
Little White River SD-WH-R-LITTLE_WHITE_02_USGS	S6, T36N, R39W to Rosebud Creek	R5	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL NA FULL			2
White River SD-WH-R-WHITE_01	NE/SD border to Willow Creek	R6	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL FULL FULL			1
White River SD-WH-R-WHITE_02	Willow Creek to Pass Creek	R7	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL NON NON FULL	Salinity (SAR) *Escherichia coli*		5
White River SD-WH-R-WHITE_03	Pass Creek to Little White River	R8	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL NON NON NON	Salinity (SAR) *Escherichia coli* Total Suspended Solids		5
White River SD-WH-R-WHITE_04	Little White River to confluence with Missouri River	R9	Fish/Wildlife Prop, Rec, Stock Irrigation Waters Limited Contact Recreation Warmwater Semipermanent Fish Life	FULL FULL NON FULL	*Escherichia coli*		5

White River Basin



Integrated Report Category Legend

- All Uses Met (1)
- Some Uses Met/Insufficient Data for other Uses (2)
- Impaired with approved TMDL (4A)
- Impaired without approved TMDL (5)
- Insufficient Data (3)

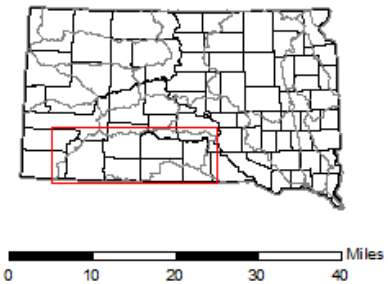


Figure 23: White River Basin

WETLANDS

Wetland resources across the Prairie Pothole Region (PPR) of eastern South Dakota provide many ecological services (Figure 24). Wetlands provide hydrologic services such as water and nutrient storage and flood relief. They also enhance waterfowl production and promote biodiversity. Growing awareness of the importance of wetlands prompted the U.S. Fish and Wildlife Service (USFWS) in 1974 to conduct an inventory of U.S. wetlands, also known as the National Wetlands Inventory. The Cowardin et al. (1979), classification system was adopted by the USFWS to classify wetlands based on hydrologic, geomorphologic, biologic, and chemical characteristics. The National Wetlands Inventory provides valuable documentation regarding identity, extent, characteristics and distribution of wetland resources in the PPR.

Figure 24: Map Depicting Prairie Pothole Region

The PPR of eastern South Dakota had an estimated 1,780,859 acres of wetlands with shallow water habitat in the early to middle 1990's (Johnson and Higgins, 1997). By 2009, South Dakota had an estimated 1,870,790 acres of shallow water wetlands (Dahl, 2014). The total number of wetlands in South Dakota declined by 2.8% from 1997 to 2009 (Dahl, 2014). Small temporary wetlands comprised the primary type of emergent wetland loss. South Dakota did exhibit gains in all other emergent wetland classes especially larger seasonal and semipermanent classes between 1997 and 2009. This implies that the overall wetland area in South Dakota increased from the early to middle 1990s to 2009, which is consistent with the wetland area estimates provided by Johnson and Higgins (1997) and Dahl (2014). The wetland acreage estimates provided by Dahl (2014) represent the most recent documentation of wetland extent available for South Dakota.

The general loss of small temporary wetlands and gain in larger seasonal and semipermanent wetlands can be attributed to agricultural drainage practices. Portions of eastern South Dakota lack open channel ditch networks to convey water from wetland depressions in agricultural fields to riverine systems. Drainage from small temporary wetlands is often conveyed by drain tile networks to downstream basins contributing to the increase in seasonal or semipermanent wetland habitats. The general loss of temporary wetlands and overall increase in acreage of seasonal and semi-permanent is likely the present trend.

DENR defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (ARSD Chapter 74:51:01:01(53)). Wetlands are designated the beneficial use of fish and wildlife propagation, recreation and stock watering, which provides protection under existing narrative and numeric water quality standards. The USACE is responsible for the control of activities that place fill in wetlands. The USACE authority stems from Section 404 of the CWA. For purposes of Federal 404 identification and delineation, wetlands must have each of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly hydric soil, and (3) the substrate is saturated with water or covered by shallow water at some time during the growing season of each year. Before exercising its authority on a particular action, the USACE issues a public notice, taking into consideration the comments of the EPA, GF&P, DENR, and other resource agencies. Construction projects involving wetlands must receive certification from DENR under Section 401 of the CWA to certify the action will not violate South Dakota Surface Water Quality Standards. DENR regulates the discharge of pollutants to wetlands under the Surface Water Discharge permitting program.

The USFWS and private entities, such as Ducks Unlimited, work to protect and preserve wetland resources in South Dakota. An estimated 700 US Fish and Wildlife Service Waterfowl Production Areas (WPAs) covering about 183,000 acres of uplands and wetlands were purchased in South Dakota by 1994 (Johnson and Higgins 1997). The USFWS has also obtained easements on an estimated 613,000 acres of eastern South Dakota wetlands through 1994. Approximately 51,000 acres of wetlands are currently owned by GF&P and managed as State Game Production Areas and Public Shooting Areas. Many of these aforementioned entities continue to purchase, obtain easements and manage wetland habitats for the purpose of preservation.

EPA is encouraging states to develop monitoring and assessment tools to determine the ecological integrity of wetland environments. EPA currently promotes three approaches to wetland assessment. A Level-1 assessment is a landscape level screening process using GIS technology and other geo-database information systems to evaluate potential impacts to wetland environments. Level-2 assessments incorporate Level-1 information and rapid, on-site evaluations of wetland attributes for comparison among wetlands. Level-3 assessments require a more rigorous and comprehensive physiochemical and biological assessment of wetland resources.

The Natural Resource Management Department at SDSU, in cooperation with GF&P, developed a Level-1 and Level-2 wetland rapid assessment protocol for prairie pothole wetlands in eastern South Dakota. The assessment method was modified from a protocol developed by the South Florida Water Management District (Miller and Gunsalus 1999) for evaluating wetland condition. The South Dakota wetland rapid assessment protocol was developed for the state’s Natural Heritage and Wildlife Habitat Programs (GF&P) for identifying reference wetlands, monitoring randomly selected sites, and evaluating wetland restoration efforts.

A Level-3 wetland assessment was developed within the Prairie Pothole Region of South Dakota. This Level-3 assessment focused on development of an Index of Plant Community Integrity (IPCI) originally developed to assess seasonal wetlands in the Prairie Pothole Region (DeKeyser et al. 2003). The IPCI was modified to evaluate the vegetative composition of wetlands across classification (temporary and semipermanent) and

disturbance (native grass to cropland) gradients within the Northern Glaciated Plains and Northwestern Glaciated Plains ecoregions of South Dakota, North Dakota, and Montana. The IPCI method can be used in South Dakota to allow the placement of wetlands into disturbance classes for ecological and mitigation needs (Hargiss et al. 2007). During the course of the IPIC development in South Dakota, researchers noted that the ecological health of eastern South Dakota prairie pothole wetlands decrease from north to south. This was attributed to greater agricultural intensity in southeast South Dakota (Dekeyser, personal communication).

Wetland drainage using subsurface drain tile continues to be a popular agricultural practice in eastern South Dakota. Agricultural producers are motivated to drain small nuisance wetlands or wet pockets in fields to increase tillable acres. Producers enrolled in USDA programs are required to gain approval before engaging in wetland drainage practices. The NRCS conducts criteria-based wetland determinations to determine a wetland's eligibility for drainage. Wetland drainage is most prevalent in eastern counties of South Dakota.

Potential environmental impacts associated with wetland drainage have become topics of concern within the natural resource management community. The main concern involves the potential for increased nutrient transport and flow to downstream receiving waters. In addition, the loss of wetland habitat may be detrimental to wildlife, especially waterfowl and other birds that rely on these systems during migration. Because drainage activities primarily focus on small, isolated, non-navigable wetlands, most do not fall under CWA jurisdiction or any other federal protection. Drainage issues in South Dakota are extensive and therefore managed at the county or township level.

PUBLIC HEALTH/AQUATIC LIFE CONCERNS

The cost of routinely monitoring most toxic pollutants is prohibitive. At present, priority toxins (CWA Section 307(a) toxic pollutants) are routinely monitored at several WQM stream sites located near historic or current mining activities in the northern Black Hills. Ammonia, a priority toxin, is routinely monitored throughout the DENR ambient monitoring network and the statewide lake assessment project.

Table 34: Total Acres and Miles Affected by Toxics

Waterbody	Acres and Miles Monitored For Toxics*	Acres and Miles with Elevated Levels of Toxics**
Rivers (miles)	5,916	2
Lakes (acres)	137,811	50

* Ammonia, cyanide, chlorine, and/or metals including arsenic.
** Elevated levels are defined as exceedances of state water quality standards, 304(a) criteria, and/or FDA action levels, or levels of concern (where numeric criteria do not exist).

Aquatic Life (Fish Kills)

There were 23 separate aquatic life concern incidents investigated from October 1, 2015, to September 30, 2017. The majority of these kills occurred due to winter kill or summer kill.

The USFWS *Field Manual for the Investigation of Fish Kills* offers the following guide for reporting fish kills:

Minor Kill:	Less than 100 fish
Moderate Kill:	100 to 1,000 fish in 1.6 km of stream or equivalent lentic area.
Major Kill:	More than 1,000 fish in 1.6 km of stream or equivalent lentic area.

By these standards, there were twenty minor fish kills and three moderate fish kills during this reporting cycle in South Dakota.

It is extremely important that the initial phases of an investigation be performed at the earliest indication of a fish kill. The need for such urgency is due to the fact that fish degrade rapidly, and the cause of death may become unidentifiable within a very short time. Unfortunately, DENR and/or GF&P are often notified days after an incident has occurred. For this reason, the department is occasionally unable to positively identify the event that caused the fish kill.

DENR reviews the cause(s) of a fish kill, the waterbody's designated beneficial uses, and the water quality sample data to determine impairment. Marginal fisheries may experience frequent fish kills, while semipermanent fisheries may experience occasional fish kills due to natural environmental conditions. DENR would consider a waterbody as impaired due to a fish kill if water quality data suggest that the cause of impairment is related to human influence. However, a waterbody that experiences a fish kill due to a single occurrence spill and has been remediated, will not be listed as impaired. For this 2018 Integrated Report cycle, there were no waterbodies listed as impaired due to fish kills (Table 35).

Table 35: Summary of Fish Kill Investigations

Date	Waterbody	County	Severity	Cause
05/01/2016	North Fork Yellowbank River	Grant	minor	runoff from feed storage area causing low DO
06/13/2016	Battle Creek	Pennington	minor	stored sediment flush
06/21/2016	Spearfish Creek	Lawrence	minor	water diverted causing stranded fish
07/13/2016	Wall Lake	Minnehaha	minor	summer kill
07/29/2016	Ravine Lake	Beadle	moderate	summer kill
08/05/2016	Lake Kampeska	Codington	minor	unknown
08/15/2016	Wilmarth Lake	Aurora	minor	unknown
08/21/2016	Lake Faulkton	Faulk	moderate	summer kill
03/02/2017	Bear Butte Creek	Meade	minor	winter kill
03/02/2017	Curlew Lake	Meade	minor	winter kill
03/05/2017	New Underwood Dam	Pennington	minor	winter kill
03/06/2017	Belvidere Lake	Jackson	moderate	winter kill
03/06/2017	Kadoka Lake	Jackson	minor	winter kill
03/06/2017	Swan Lake	Bennett	minor	winter kill
03/25/2017	Big Foot Lake	Pennington	minor	winter kill
03/25/2017	Haynes Lake	Pennington	minor	winter kill
03/27/2017	Kerpan Lake	Pennington	minor	winter kill
03/30/2017	Shadehill Reservoir	Perkins	minor	winter kill
04/03/2017	Waggoner Lake	Haakon	minor	winter kill
06/06/2017	Bad River	Stanley	minor	temperature changes
06/09/2017	Old Wall Lake	Pennington	minor	summer kill
07/24/2017	Cottonwood Springs Lake	Fall River	minor	summer kill
09/04/2017	Waggoner Lake	Haakon	minor	summer kill

Unsafe Beaches

During the 2010 legislative session, the legislature passed a bill which removed DENR's authority to regulate public beach closures. Effective April 15, 2013, Public Beach Standards, Chapter 74:04:08 was deleted from ARSD. Bacteria data collection and decisions related to public swimming beach closures are the responsibility of the particular management agency. DENR solicits water quality information including beach closure information from federal, state and local natural resource agencies during the department's request for data process. DENR will list a waterbody as impaired if three beach closures per season occur in a consecutive three-week sampling period. For the 2018 reporting period, DENR was notified that Sylvan Lake and Stockade Lake in Custer State Park were closed for swimming during the summer of 2017. The closures were temporary and did not warrant an impairment listing.

Fish Flesh Contaminants

The Surface Water Quality Program, in partnership with the South Dakota Department of Game, Fish, and Parks, and the South Dakota Department of Health sample and analyze fish from a variety of waterbodies. DENR has been collecting and actively studying fish flesh contaminant data since 1994. The purpose of this work is to determine the concentration of various contaminants in fish to protect public health. Waterbodies are selected for monitoring based on GF&F fishery management objectives, public access, and fishing pressure. Subsequently, this data is also used to assess support of the surface water quality criterion of mercury in fish tissue. A list of waterbodies sampled for fish flesh contaminants is available at: http://denr.sd.gov/des/sw/fish.aspx. Not all waterbodies in this report have been assessed for mercury in fish tissue.

The Food and Drug Administration (FDA) has set 1.0 mg/kg total mercury as the action level for commercial fish. In South Dakota, the Department of Health is responsible for issuing fish consumption advisories and uses the FDA action level. For a list of South Dakota waterbodies with fish consumption advisories refer to the Department of Health website at http://doh.sd.gov/food/fish-advisories.aspx. DENR also assesses mercury in fish tissue but with the purpose of determining if the waterbody is supporting its beneficial uses.

Because fish consumption advisories are issued on waterbodies that exceed 1.0 mg/kg mercury in fish tissue FDA criterion and the DENR assesses waterbody support using the surface water quality criterion of 0.3 mg/kg mercury in fish tissue, there are waterbodies in this Integrated Report that are not meeting their designated uses due to mercury in fish tissue based on a water quality standard but may not have a fish consumption advisory. Although mercury in fish tissue is the common factor, public advice on fish consumption and waterbody beneficial use support are separate issues that are addressed by different state agencies. When determining that a waterbody is not meeting its beneficial uses due to the mercury in fish tissue water quality criterion, DENR does not have the authority to provide advice regarding the consumption of fish from those waterbodies. The South Dakota Department of Health provides public health advice. Waterbodies with fish consumption advisories and/or waterbodies that exceed the surface water quality criterion are considered nonsupporting.

Domestic Water Supply Restrictions

There are currently no water consumption restrictions on waterbodies with the domestic water supply beneficial use designation. However, the James River (James River Diversion Dam to Huron 3rd Street Dam), Firesteel Creek, Elm River, and Lake Mitchell are listed as not supporting the domestic water supply beneficial use. The James River reach is no longer used as a public water source; and Firesteel Creek and Lake Mitchell are only used as an emergency backup for the City of Mitchell. The Elm River is used as the water supply for the city of Aberdeen. The following tables contain information on reach descriptions and pollutant causes.

Table 36: Waterbodies Affected by Domestic Water Supply Restrictions

Name of Waterbody	Waterbody Type	Type of Restriction			Cause(s) (Pollutant(s)) of Concern	Source(s) of Pollutants
		Closure[a] (Y/N)	Advisory[b] (Y/N)	Other (explain)		
None	-	-	-	-	-	-

[a]Closures- restrict all consumption from a domestic water supply.
[b]Advisories- require that consumers disinfect water (through boiling or chemical treatment before ingestions).

Table 37: Summary of Waterbodies Not Fully Supporting Domestic Water Supply Use

Waterbodies	AUID	Location	Characterization	Cause(s)
River and Streams				
James River	SD-JA-R-JAMES_07	James River Diversion Dam to Huron 3rd Street Dam	Not Supporting	Total Dissolved Solids
Firesteel Creek	SD-JA-R-FIRESTEEL_01	West Fork Firesteel Creek to mouth	Not Supporting	Total Dissolved Solids
Elm River	SD-JA-R-ELM_01	Elm Lake to mouth	Not Supporting	Total Dissolved Solids
Lakes and Reservoirs				
Lake Mitchell	SD-JA-L-MITCHELL_01	Davison County	Not Supporting	Chlorophyll-*a*

IV. POLLUTION CONTROL PROGRAMS

POINT SOURCE POLLUTION CONTROL PROGRAM

The state received delegation of the federal National Pollutant Discharge Elimination System (NPDES) program from the United States Environmental Protection Agency (EPA) on December 30, 1993. The NPDES permits issued by the state are referred to as Surface Water Discharge (SWD) permits. EPA continues to issue NPDES permits in South Dakota for facilities over which they retained jurisdiction. As of September 30, 2017, the state has issued a total of 240 individual SWD permits in South Dakota. In addition, DENR has issued coverage to 2,327 facilities under General Storm Water permits, 234 facilities under Multi-Media General permits (Storm Water & Air Quality), and 376 facilities under other General permits. DENR has also issued 24 biosolids-only permits.

Technology-based controls are placed in most SWD and NPDES permits. However, technology-based controls alone do not necessarily protect waters of the state from toxic pollutants. Therefore, water quality-based limits and toxicity testing requirements are also placed in many of the permits.

Water quality-based limits are developed when technology-based limits alone are not adequate to protect the beneficial uses of the receiving stream. In these cases, the state develops water quality-based effluent limits to ensure the surface water quality standards are met and maintained.

The state continues to require whole effluent toxicity testing for all major SWD permitees and certain significant minors. The goal of the whole effluent toxicity approach is to ensure that point source discharges do not contain toxics in toxic amounts. If toxicity is found, the discharger is required to conduct an evaluation of the discharge to determine the source of the toxicity and eliminate the toxicity.

The South Dakota Surface Water Quality Standards contain the following provision concerning discharges to lakes:

> ***ARSD 74:51:01:27. Lakes not allowed a zone of mixing.*** *No zone of mixing is allowed for lakes. Discharges to lakes must meet the water quality standards at the point of discharge. No discharge of pollutants is allowed which reaches a lake classified for the beneficial use of coldwater permanent, coldwater marginal, warmwater permanent, warmwater semipermanent, or warmwater marginal fish life propagation or causes impairment of an assigned beneficial use.*

DENR's Surface Water Discharge permitting program regulates the discharge of pollutants from point sources. In most cases, DENR has not allowed discharges to lakes classified for the fish life propagation uses outlined in ARSD Chapter 74:51:01:27. There have been only limited exceptions to this provision.

Many of South Dakota's streams eventually drain into classified lakes. If a point source discharges into a tributary of a lake, DENR takes into account the distance from the lake and the natural attenuation of any pollutants present before the discharge is permitted. During the reissuance of each of these permits, DENR re-evaluates these discharges. If DENR determines that a discharge has a potential to impact a classified lake, DENR has required the point source

to cease its discharge to the classified lake. DENR has permitted discharges of uncontaminated water to lakes (i.e. non-contact cooling water).

To date, this approach has protected South Dakota's lakes and has not caused or contributed to a violation of the surface water quality standards from a point source discharge.

To help ensure that wastewater collection and treatment systems in the state are in compliance, the department provides cost share funding for their planning, design, and construction. The department administers the Clean Water State Revolving Fund (CWSRF) Loan Program which provides low interest loans to publicly owned wastewater facilities. The department's CWSRF Intended Use Plan establishes the criteria the department uses for fund awards. The Intended Use Plan can be accessed at:

http://denr.sd.gov/dfta/wwf/cwsrf/18cwsrfiup.pdf

Between October 1, 2015, and September 30, 2017, the department's Board of Water and Natural Resources awarded 46 CWSRF loans and one loan amendment totaling $90,699,125. Portions of six of the awards were provided as additional subsidy in the form of principal forgiveness. The principal forgiveness totaled $2,968,700. These funds were used for the design and construction of sanitary sewer collection systems, wastewater treatment facilities, storm sewers, and landfill construction associated with the protection of groundwater.

The current CWSRF interest rates are 2.0% for loans with a term of 10 years or less, 2.25% for loans with a term greater than 10 years up to 20 years, and 2.50% for loans with a term greater than 20 years up to a maximum of 30 years. There is also a nonpoint source incentive loan rate for communities that are sponsoring a nonpoint source implementation project. The loan rate for these projects ranges from 1.00% for up to 10 years, 1.25% for loans with a term greater than 10 years up to 20 years, and 1.50% for loans with a term greater than 20 years up to a maximum of 30 years.

CWSRF administrative surcharge fees have been used to provide grant assistance for various clean water activities. To encourage responsible and proactive engineering planning, the Board uses CWSRF administrative surcharge funds to cost share engineering planning studies for small communities (2,500 population and below). Between October 1, 2015, and September 30, 2017, the department awarded a total of $218,320 for 21 engineering studies. The Board awarded $2,273,000 for the construction of four wastewater improvement projects and $243,000 for four nonpoint source implementation projects.

The Series 2010A bonds that were issued in December 2010 were designated as Build America Bonds. As a result the District receives subsidy payments from the U.S. Treasury equal to 35% of the interest payable on its Series 2010A Bonds. In fiscal years 2016 and 2017, $2,750,000 of Build America Bond subsidy payments was allocated to provide additional grants for wastewater projects. Between October 1, 2015, and September 30, 2017, the Board awarded $2,750,000 for the construction of three wastewater improvement projects

South Dakota has a state water planning process that was established in 1972. This establishes an orderly planning process for water development. In addition, the state established a dedicated water funding program in 1993. The dedicated funding sources provide approximately $9.5 million annually. Between October 1, 2015, and September 30, 2017, $9,827,000 in state grants were awarded to 13 wastewater collection or treatment and storm water projects. Additionally, $550,000 in state grants were awarded to provide nonfederal cost share for one Section 319 nonpoint source implementation project.

COST/BENEFIT ASSESSMENT

DENR provides the Governor and Legislature with annual reports summarizing water and wastewater development activities for the preceding calendar year. The 2015 and 2016 annual reports can be accessed at:

http://denr.sd.gov/documents.aspx#Funding

Information on operation and maintenance costs for local units of government is not readily available. Not all benefit data are readily available, but some information has been included in the Statewide Surface Water Quality Summary section of this report.

NONPOINT SOURCE POLLUTION CONTROL PROGRAM

South Dakota's nonpoint source pollution management activities are implemented through the South Dakota Nonpoint Source Pollution Management Program. The primary focus of the program is the control of nonpoint source pollution through the use of voluntary implementation of best management practices (BMPs) and holistic resource management plans. The major sources of NPS pollution in South Dakota are summarized in Table 38.

The program coordinates its NPS control activities with local, state, and federal agencies and stakeholder organizations. These agencies and organizations provide BMPs and financial and technical assistance that increase the program's capacity to develop and implement NPS management projects.

The remainder of this section provides a summary that describes the South Dakota Nonpoint Source Pollution Management Program and the types of NPS projects that are being developed and implemented. Additional information concerning the program and projects may be obtained by consulting the South Dakota Nonpoint Source Management Program Plan and annual reports. Copies of these documents are available from the DENR, the South Dakota State Library, or by visiting:

http://denr.sd.gov/dfta/wp/wp.aspx

South Dakota Nonpoint Source Management Program

The South Dakota Nonpoint Source Pollution Management Program is housed in the DENR Watershed Protection Program (WPP). NPS pollution activities completed by program staff are selected to improve, restore, and maintain the water quality of the state's lakes, streams wetlands, and ground water in partnership with other agencies, organizations, and citizen groups.

Implementation of the NPS Pollution Management Program is guided by the South Dakota Nonpoint Source Management Plan. The most recent revision of South Dakota's NPS Management Plan was submitted to EPA in September 2014. The Plan is scheduled to be revised in 2019.

The NPS Management Plan:

- addresses the nine mandated elements required to access Section 319 funds;
- expands on activities included in previous editions of the plan; and

- continues to achieve improved water quality through voluntary actions developed in partnership with the landowners and managers.

The primary tools selected to accomplish the tasks outlined in the plan include:

- technical and financial assistance delivered through program staff and project partnerships; and
- a comprehensive information and education effort.

A copy of the management plan is available upon request or by visiting:

http://denr.sd.gov/dfta/wp/documents/NPSMgmtPlan14.pdf

A key element in implementing the South Dakota NPS Management Plan is the South Dakota Nonpoint Source Task Force. The task force is a citizen's advisory group composed of approximately 25 agencies, organizations, and tribal representatives. The task force:

- provides a forum for the exchange of information on activities that impact nonpoint source pollution control;
- prioritizes waterbodies for NPS control activities;
- provides guidance and application procedures for funding NPS control projects;
- reviews project applications;
- recommends projects to the South Dakota Board of Water and Natural Resources for funding approval;
- serves as the coordinating body for the review and direction of federal, state, and local government programs to ensure that the programs will achieve NPS pollution control efficiently;
- serves as a focal point for the information, education, and public awareness regarding NPS pollution control;
- provides oversight of NPS control activities and prioritize the activities; and
- provides a forum for discussion and resolution of program conflicts.

For additional information about the task force visit:

http://denr.sd.gov/dfta/wp/npstf.aspx

South Dakota Nonpoint Source Projects

Since the reauthorization of the CWA in 1987, the South Dakota NPS Pollution Management Program has used Section 319, 104(b)(3), 106, 604(b), Pollution Prevention, and state and local funding to support more than 266 NPS projects. During 2017, there were 12 active NPS projects. The total includes six watershed/TMDL implementations, three statewide BMP planning and technical assistance projects, two BMP research projects, and one information and education project. The technical assistance projects provide project sponsors with technical assistance for planning and arranging funding for livestock feeding and riparian management and other sediment and nutrient reduction BMP installation. In addition, TMDL development efforts not specifically associated with the aforementioned NPS sponsored projects are conducted by DENR program staff.

A list of the projects funded can be found in the South Dakota Nonpoint Source Management Program Annual Report. A copy of the report may be obtained from the South Dakota Department of Environment and Natural Resources, the South Dakota State Library, or by visiting:

http://denr.sd.gov/dfta/wp/npsannualreports.aspx

Project implementation plans, reports of project progress/results, and final reports for completed projects are available on the EPA Grants Reporting and Tracking System. Copies of final reports are also available by contacting DENR or the South Dakota State Library. Electronic copies of the final report for many of the more recently completed projects are available on the DENR web site or by visiting:

http://denr.sd.gov/dfta/wp/wqinfo.aspx

While the size, target audience, and structure of the projects vary; all share common elements:

- increase awareness of NPS pollution issues;
- identify, quantify, and locate sources of nonpoint source impairment;
- reduce or prevent the delivery of NPS pollutants to waters of the state with emphasis on meeting targets established through total maximum daily loads (TMDLs), and disseminate information about effective solutions to NPS pollution.

Although most of the projects fit into one of the following three categories: assessment/development, information and education, watershed implementation, most include components of each category.

Historically, the majority of the projects developed and implemented focused on reducing NPS pollution originating from agricultural operations. More recently, increased resources have been directed toward local initiatives that:

- evaluate water quality conditions;
- determine sources and causes of NPS pollution within priority watersheds; and
- develop and implement total maximum daily loads (TMDLs) for impaired waterbodies.

Waterbodies assessed are selected from those on the 303(d) list of impaired waterbodies. Activities included in implementation project work plans are selected to reach the TMDLs developed as part of the assessment process.

TMDLs are prepared as a part of an assessment project. Activities completed during an assessment project include an inventory of existing data and information and supplemental monitoring, as needed, to allow an accurate assessment of the watershed. Through these efforts, local project sponsors are able to:

- determine the extent to which beneficial uses are impaired;
- identify specific sources and causes of the impairments;
- establish preliminary pollutant reduction goals or TMDL endpoints; and
- identify management practices and alternatives that will reduce the pollution at its source(s) and restore or maintain the beneficial uses of the waterbody.

The project period for assessment/development projects generally ranges from one to three years.

Information and education projects are designed to provide information about NPS pollution issues and solutions. Information transfer tools typically used by the department and its project partners include brochures, print and electronic media, workshops, BMP implementation

manuals, tours, exhibits, and demonstrations. Information and education projects usually range from one to five years in length. During recent years the NPS Program has:

- focused a portion of its information and education efforts on the development of BMPs to improve management of nutrients originating from livestock operations through a partnership with the academic community; and
- formed a partnership with the South Dakota Discovery Center for the implementation of the statewide information and education efforts that target a wider cross section of the state's population.

Watershed projects are the most comprehensive type of project implemented through the South Dakota NPS Pollution Management Program. Watershed projects are typically long term in duration and designed to implement TMDLs that address NPS pollution sources and beneficial use impairments identified during the completion of an assessment project. Common watershed project objectives include:

- protect/restore impaired beneficial uses through the promotion and voluntary implementation of best management practices (BMPs) that prevent/reduce NPS pollution;
- disseminate information about NPS pollution and effective solutions; and
- evaluate project progress toward use attainment or NPS pollutant reduction goals.

Watershed projects typically range from four to ten years in length with the duration being dependent on the size of the watershed and extent of the NPS pollution impacts that must be addressed.

Nonpoint Source Pollution Control Program Funding Strategy

DENR receives approximately $2.5 million Section 319 funds annually from EPA. Administrative costs total about $770,000. The remaining $1.7 million is made available for project awards. DENR attempts to package the funding for TMDL assessment and implementation projects using a variety of other department, state, federal, or private funding.

Other department funds used for cost share include department fee funds, 604(b) funds, 106 funds, Clean Water SRF administrative surcharge funds, and Clean Water SRF conventional loan funds.

State financial resources from other programs commonly used in implementing NPS projects include the Department of Agriculture's Soil and Water Conservation Grant funds, Game, Fish & Parks funds, and Water Development District funds. Private funds include wildlife groups and conservation organizations.

Other federal funding sources commonly used in completing NPS projects include U.S. Department of Agriculture's Environmental Quality Incentive Program, Conservation Stewardship Program, Agricultural Conservation Easement Program, and Conservation Reserve Programs.

The implementation projects can be expensive. To ensure that timely progress is made, DENR typically awards funds for an initial two to three year implementation project. Subsequent segments are funded only if sufficient progress is made during the previous phase.

Implementation projects funded are typically designed to implement multiple TMDLs in a geographic or river basin area. This practice increases efficiency in the use of limited financial resources and provides the local sponsor and its partners with the opportunity to hire a more highly skilled project staff.

TMDL assessments in eastern South Dakota indicate bacteria and TSS reductions may be achieved through the implementation of a suite of BMPs. DENR limits Section 319 funding primarily to riparian area restoration, livestock exclusion, and installation of animal waste systems for small animal feeding operations. The department's project partners are urged to seek funding for other BMPs from the Environmental Quality Incentive Program and other state and federal programs.

Implementation projects typically begin at about $200,000 and can run as high as several million dollars. The cost depends on the size of the watershed and the estimated number and types of BMPs needed to attain the project TMDL goal(s).

For information about specific South Dakota NPS projects funded using CWA Section 319 funds, contact DENR, or access EPA's Nonpoint Source Grants Reporting and Tracking System database. The following web links depict watersheds where NPS assessment and implementation projects have been conducted.

http://denr.sd.gov/dfta/wp/maps/319projectmapassess2017.pdf

http://denr.sd.gov/dfta/wp/maps/319projectmapimp2017.pdf

Table 38: South Dakota Categories and Subcategories of NPS Pollution Sources

Agriculture	Resource Extraction/Exploration/Development
Crop Production	Surface Mining (historic)
Pasture grazing-riparian and upland	Subsurface Mining
Animal feeding operations	Petroleum activities
Rangeland – riparian and upland	Acid mine drainage
Silviculture	**Habitat Modification**
Harvesting, restoration, residue management	Removal of riparian vegetation
Forest management	Drainage/filling of wetlands
Logging road construction/maintenance	Streambank modification/destabilization
Bank or shoreline modification/destabilization	
Construction Runoff	**Urban Runoff**
<1 acre highway/road/bridge construction projects	Surface Runoff
Land development	Highway/road/bridge runoff
Channelization	
Other	
Dam construction	
Golf courses	
Atmospheric deposition	
Waste storage/storage tank leaks	
Spills	
Erosion and sedimentation	
Drought-related impacts	
Natural Sources	

Future Nonpoint Source Program Directions

NPS pollution originates from diverse sources and control activities must reflect this by using all available resources from various state, federal, and local organizations. In addition, it is imperative to gain landowner support and participation. The technical and financial assistance currently available is not sufficient to solve all NPS pollution issues in the state. Landowners need to understand the issues and resolution options. Educating the public about NPS pollution issues may prompt landowners to voluntarily implement activities that not only control NPS pollution, but benefit the operation. New federal programs must also be developed to supplement existing programs. The continuation of existing activities coupled with the addition of innovative new programs will ensure that South Dakota remains a leader in nonpoint source pollution control.

V. PUBLIC PARTICIPATION PROCESS

To fulfill the requirements of the CWA and involve the affected community and stakeholders in the water quality improvement process, a public participation process is implemented. Summarized below are the procedures employed by DENR to involve the public and affected parties.

Process Description

First Public Review/Input Period
An ad is published in ten statewide daily newspapers, announcing DENR is developing the Integrated Report and requesting water quality data that will aid in the assessment of South Dakota's waters. This announcement is also sent to approximately 120 individuals and organizations.

Second Public Review Period
Data received after the first public review period and additional data gathered by DENR are reviewed and a draft Integrated Report is developed. The draft report is released for a 30-day public review and comment period. The announcement on the availability of the draft report is again published in the ten daily newspapers. The draft report is also made available on DENR's web page at: http://denr.sd.gov/documents/18irdraft.pdf. At this time, the draft report is also provided to EPA Region 8 for review and comment.

Personnel from DENR respond to inquiries and are available to meet with interested groups about the list and listing process. Copies of public participation documents and responses to oral and written comments received during the comment period are included in Appendix F.

VI. REFERENCES

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VII. KEY TO ABBREVIATIONS

ATTAINS – EPA's Assessment Database (used for Integrated Report development)
ARSD – Administrative Rules of South Dakota
AUID – Assessment Unit Identifier
BMP – best management practice
CWSRF – Clean Water State Revolving Fund
DENR – South Dakota Department of Environment and Natural Resources
DO – dissolved oxygen
EDWDD – East Dakota Water Development District
EPA – Environmental Protection Agency
E. coli - *Escherichia coli*
GF&P – South Dakota Department of Game, Fish and Parks
HCI – Habitat Condition Index
IBI - Index of Biotic Integrity
IPCI – Index of Plant Community Integrity
IR – Integrated Report
MPCA – Minnesota Pollution Control Agency
NE DEQ – Nebraska Department of Environmental Quality
NLA - National Lake Assessment
NGP - Northern Glaciated Plains
NPDES – National Pollutant Discharge Elimination System
NPS – Nonpoint Source
NRCS – Natural Resources Conservation Service
PPR-Prairie Pothole Region
QA/QC – quality assurance/quality control
SAR – Sodium adsorption ratio
SDSU – South Dakota State University
STORET – EPA computer data storage and retrieval system
SWD – Surface Water Discharge
SWLA – Statewide Lakes Assessments
SRAM – seasonal riparian area management
TMDL – Total Maximum Daily Load
TN – Total Nitrogen
TP – Total Phosphorus
TSI – Carlson's (1997) Trophic State Indices
TSS – total suspended solids
USACE – United States Army Corp of Engineers
USBOR – United States Bureau of Reclamation
USDA – United States Department of Agriculture
USGS – United States Geological Survey
WQM – ambient water quality monitoring
WQS – South Dakota Surface Water Quality Standards
USFWS – United States Fish and Wildlife Service

APPENDICES

APPENDIX A

WATERBODIES WITH EPA APPROVED TMDLS

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Bad	Freeman Lake	SD-BA-L-FREEMAN_01	Jackson County	Nitrates/Selenium	2/7/2001	1507
Bad	Freeman Lake	SD-BA-L-FREEMAN_01	Jackson County	Total dissolved solids	9/26/2012	42516
Bad	Hayes Lake	SD-BA-L-HAYES_01	Stanley County	TSI	9/29/2004	10976
Bad	Hayes Lake	SD-BA-L-HAYES_01	Stanley County	Mercury in Fish Tissue	3/1/2016	65381
Bad	Murdo Dam	SD-BA-L-MURDO_01	Jones County	Mercury in Fish Tissue	3/1/2016	65382
Bad	Sheriff Dam	SD-BA-L-SHERIFF_01	Jones County (FPNG)	Mercury in Fish Tissue	8/18/2016	65867
Bad	Bad River	SD-BA-R-BAD_01	Stanley County line to mouth	TSS	2/7/2001	1537
Belle Fourche	Belle Fourche River		Wyoming to near Fruitdale	TSS	2/2/2005	11383
Belle Fourche	Belle Fourche River		Near Fruitdale to Whitewood Creek	TSS	2/2/2005	11384
Belle Fourche	Newell Lake	SD-BF-L-NEWELL_01	Butte County	Mercury in Fish Tissue	3/1/2016	64500
Belle Fourche	Orman Dam (Belle Fourche Reservoir)	SD-BF-L-ORMAN_01	Butte County	Mercury in Fish Tissue	3/1/2016	65384
Belle Fourche	Bear Butte Cr.	SD-BF-R-BEAR_BUTTE_02	Strawberry Cr. To near Bear Den Mountain	TSS	8/8/2007	33703
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_01	Wyoming to Redwater River	Fecal coliform	10/17/2011	41417
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_01	Wyoming to Redwater River	*E. coli*	8/31/2017	68243
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_03	Whitewood Creek to Willow Creek	TSS	2/2/2005	11385
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_04	Willow Creek to Alkali Creek	TSS	2/2/2005	11386
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_05	Alkali Creek to mouth	*E. coli*/fecal coliform	10/17/2011	41418/ 41419

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Belle Fourche	Belle Fourche River	SD-BF-R-BELLE_FOURCHE_05	Alkali Creek to mouth	TSS	2/2/2005	11387
Belle Fourche	Horse Creek	SD-BF-R-HORSE_01_USGS	Indian Creek to mouth	TSS	2/2/2005	11382
Belle Fourche	Strawberry Creek	SD-BF-R-STRAWBERRY_01	Bear Butte Creek to S5, T4N, R4E	Cadmium	4/19/2010	38462
Belle Fourche	West Strawberry Creek	SD-BF-R-W_STRAWBERRY_01	Headwaters to mouth	Fecal coliform	4/6/2011	40169
Belle Fourche	Whitewood Creek	SD-BF-R-WHITEWOOD_03	Deadwood Creek to Spruce Gulch	*E. coli*/fecal coliform	7/28/2011	41059
Big Sioux	Big Sioux River		I-29 to near Dell Rapids	TSS	5/28/2008	34495
Big Sioux	Big Sioux River		Near Dell Rapids to Below Baltic	Fecal coliform	5/28/2008	34494
Big Sioux	Big Sioux River		SD/IA border to Nine Mile Creek	*E. coli*	1/23/2008	34093
Big Sioux	Lake Albert	SD-BS-L-ALBERT_01	Kingsbury County	Mercury in Fish Tissue	3/1/2016	65387
Big Sioux	Lake Alvin	SD-BS-L-ALVIN_01	Lincoln County	TSI/fecal coliform	11/9/2001	2193/ 2194
Big Sioux	Antelope Lake	SD-BS-L-ANTELOPE_01	Day County	Mercury in Fish Tissue	3/1/2016	65388
Big Sioux	Bitter Lake	SD-BS-L-BITTER_01	Day County	Mercury in Fish Tissue	3/1/2016	64501
Big Sioux	Blue Dog Lake	SD-BS-L-BLUE_DOG_01	Day County	TSI/fecal coliform	2/7/2001	1436
Big Sioux	Brant Lake	SD-BS-L-BRANT_01	Lake County	TSI	4/12/1999	169
Big Sioux	Brush Lake	SD-BS-L-BRUSH_01	Brookings County	Mercury in Fish Tissue	3/1/2016	65389
Big Sioux	Clear Lake	SD-BS-L-CLEAR_01	Deuel County	TSI/Sediment	2/7/2001	1467
Big Sioux	Clear Lake (Hamlin)	SD-BS-L-CLEAR_H_01	Hamlin County	Mercury in Fish Tissue	3/1/2016	65390
Big Sioux	Diamond Lake	SD-BS-L-DIAMOND_01	Minnehaha County	Mercury in Fish Tissue	3/1/2016	65391

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Dry Lake	SD-BS-L-DRY_01	Codington County	Mercury in Fish Tissue	3/1/2016	65396
Big Sioux	Dry Lake Number 2	SD-BS-L-DRY_NO2_01	Clark County	Mercury in Fish Tissue	3/1/2016	65392
Big Sioux	East Oakwood Lake	SD-BS-L-E_OAKWOOD_01	Brookings County	TSI/pH	6/13/2008	34521
Big Sioux	Enemy Swim Lake	SD-BS-L-ENEMY_SWIM_01	Day County	Mercury in Fish Tissue	3/1/2016	65397
Big Sioux	Goldsmith Lake	SD-BS-L-GOLDSMITH_01	Brookings County	Mercury in Fish Tissue	3/1/2016	65398
Big Sioux	Goose Lake	SD-BS-L-GOOSE_01	Codington County	Mercury in Fish Tissue	3/1/2016	65399
Big Sioux	Lake Herman	SD-BS-L-HERMAN_01	Lake County	TSI	9/29/2004	10978
Big Sioux	Lake Herman	SD-BS-L-HERMAN_01	Lake County	Mercury in Fish Tissue	3/1/2016	65400
Big Sioux	North Island Lake	SD-BS-L-ISLAND_N_01	Minnehaha/McCook counties (formerly SD-VM-L-ISLAND_N_01)	Mercury in Fish Tissue	3/1/2016	64502
Big Sioux	Lake Kampeska	SD-BS-L-KAMPESKA_01	Codington County	Nutrients/Sediment - special approval	12/26/1996	635
Big Sioux	Lake Kampeska	SD-BS-L-KAMPESKA_01	Codington County	Mercury in Fish Tissue	3/1/2016	65401
Big Sioux	Long Lake	SD-BS-L-LONG_COD_01	Codington County	Mercury in Fish Tissue	3/1/2016	64504
Big Sioux	Lake Madison	SD-BS-L-MADISON_01	Lake County	TSI/fish kill	4/12/1999	639
Big Sioux	Minnewasta Lake	SD-BS-L-MINNEWASTA_01	Day County	Mercury in Fish Tissue	3/1/2016	64506
Big Sioux	Pelican Lake	SD-BS-L-PELICAN_01	Codington County	Nutrients/Sediment-special approval	12/26/1996	918
Big Sioux	Lake Poinsett	SD-BS-L-POINSETT_01	Hamlin County	Nutrients-special approval	11/26/1996	643
Big Sioux	Lake Poinsett	SD-BS-L-POINSETT_01	Hamlin County	Mercury in Fish Tissue	3/1/2016	65402

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Reid Lake	SD-BS-L-REID_01	Clark County	Mercury in Fish Tissue	3/1/2016	64508
Big Sioux	Rush Lake	SD-BS-L-RUSH_01	Day County	Mercury in Fish Tissue	3/1/2016	65403
Big Sioux	School Lake	SD-BS-L-SCHOOL_01	Deuel County	TSI	9/2/2008	35132
Big Sioux	Lake Sinai	SD-BS-L-SINAI_01	Brookings County	Mercury in Fish Tissue	3/1/2016	65417
Big Sioux	Swan Lake	SD-BS-L-SWAN_01	Clark County	Mercury in Fish Tissue	3/1/2016	64509
Big Sioux	Twin Lakes/W. Hwy 81	SD-BS-L-TWIN_01	Kingsbury County	Mercury in Fish Tissue	3/1/2016	64510
Big Sioux	Twin Lakes	SD-BS-L-TWIN_02	Minnehaha County	Mercury in Fish Tissue	3/1/2016	64511
Big Sioux	West Oakwood Lake	SD-BS-L-W_OAKWOOD_01	Brookings County	TSI	6/13/2008	34522
Big Sioux	Waubay Lake	SD-BS-L-WAUBAY_01	Day County	Mercury in Fish Tissue	3/1/2016	65418
Big Sioux	Beaver Creek	SD-BS-R-BEAVER_01	Big Sioux River to S9, T98N, R49W	Fecal coliform	8/10/2011	41067
Big Sioux	Beaver Creek	SD-BS-R-BEAVER_02	Split Rock Creek to SD-MN border	Fecal coliform/TSS	5/28/2008	34499
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_03	Willow Creek to Stray Horse Creek	Fecal coliform	6/4/2008	34506
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_03	Willow Creek to Stray Horse Creek	*E. coli*	8/8/2011	41060
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_07	Brookings/Moody County Line to S2, T104N, R49W	Mercury in Fish Tissue	3/1/2016	65405
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_08	S2, T104N, R49W to I-90	*E. coli*/fecal coliform	9/26/2012	42519
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_08	S2, T104N, R49W to I-90	TSS	12/6/2012	53280
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_10	I-90 to diversion return	*E. coli*/fecal coliform	9/26/2012	42520

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_10	I-90 to diversion return	TSS	12/6/2012	53281
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_11	Diversion return to SF WWTF	*E. coli*/fecal coliform	9/26/2012	42522
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_11	Diversion return to SF WWTF	TSS	12/6/2012	53282
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_12	SF WWTF to above Brandon	*E. coli*/fecal coliform	9/26/2012	42523
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_12	SF WWTF to above Brandon	TSS	12/6/2012	53283
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_13	Above Brandon to Nine Mile Creek	fecal coliform	1/23/2008	34093
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_14	Nine Mile Creek to near Fairview	*E. coli*/fecal coliform	1/23/2008	34094
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_15	Fairview to near Alcester	*E. coli*/fecal coliform	1/23/2008	34095
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_15	Fairview to near Alcester	TSS	2/1/2010	38211
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_16	Near Alcester to Indian Creek	*E. coli*/fecal coliform	1/23/2008	34096
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_16	Near Alcester to Indian Creek	TSS	2/1/2010	38213
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_17	Indian Creek to Mouth	*E. coli*/fecal coliform	1/23/2008	34098
Big Sioux	Big Sioux River	SD-BS-R-BIG_SIOUX_17	Indian Creek to Mouth	TSS	1/23/2008	38212
Big Sioux	Brule Creek	SD-BS-R-BRULE_01	Big Sioux River to confluence with its east and west forks	Fecal coliform	6/2/2011	40438
Big Sioux	East Brule Creek	SD-BS-R-EAST_BRULE_01	Confluence with Brule Creek to S3, T95N, R49W	Fecal coliform	3/24/2011	40025
Big Sioux	Flandreau Creek	SD-BS-R-FLANDREAU_01	Big Sioux River to MN border	Fecal coliform	5/28/2008	34496

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Big Sioux	Hidewood Creek	SD-BS-R-HIDEWOOD_01	Big Sioux River to US Hwy 77	Fecal coliform	6/4/2008	34509
Big Sioux	Jack Moore Creek	SD-BS-R-JACK_MOORE-01	Big Sioux River to S33, T 107N, R 49W	Fecal coliform	5/28/2008	34500
Big Sioux	North Deer Creek	SD-BS-R-NORTH_DEER_01	Six Mile Creek to US Hwy 77	Fecal coliform	5/28/2008	34501
Big Sioux	Peg Munky Run	SD-BS-R-PEG_MUNKY_RUN_01	Big Sioux River to S17, T113N, R50W	Fecal coliform	8/10/2011	41071
Big Sioux	Pipestone Creek	SD-BS-R-PIPESTONE_01	Split Rock Creek to MN border (SD/MN border to SD/MN border)	Fecal coliform	5/28/2008	34502
Big Sioux	Pipestone Creek	SD-BS-R-PIPESTONE_01	Split Rock Creek to MN border (SD/MN border to SD/MN border)	*E. coli*	9/26/2012	42524
Big Sioux	Skunk Creek	SD-BS-R-SKUNK_01	Brandt Lake to mouth	Fecal coliform	5/28/2008	34503
Big Sioux	Split Rock Creek	SD-BS-R-SPLIT_ROCK_01_USGS	At Corson, SD (West Pipestone Creek to Big Sioux River)	TSS/fecal coliform	5/28/2008	34504
Big Sioux	Spring Creek	SD-BS-R-SPRING_01	Big Sioux River to S22, T109N, R47W	Fecal coliform	5/28/2008	34505
Big Sioux	Stray Horse Creek	SD-BS-R-STRAYHORSE_01	Big Sioux River to S26, T116N, R51W	Fecal coliform	6/4/2008	34508
Big Sioux	Union Creek	SD-BS-R-UNION_01	Big Sioux River to confluence with east and west forks	Fecal coliform	8/8/2011	41062
Big Sioux	Willow Creek	SD-BS-R-WILLOW_01	Big Sioux River to S7, T117N, R50W	Fecal coliform	6/4/2008	34507
Cheyenne	Center Lake	SD-CH-L-CENTER_01	Custer County	pH	3/24/2011	33707
Cheyenne	Center Lake	SD-CH-L-CENTER_01	Custer County	TSI	8/8/2007	33707
Cheyenne	Curlew Lake	SD-CH-L-CURLEW_01	Meade County	Mercury in Fish Tissue	3/1/2016	65406
Cheyenne	Horsethief Lake	SD-CH-L-HORSETHIEF_01	Pennington	pH	3/24/2011	40026

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Cheyenne	Legion Lake	SD-CH-L-LEGION_01	Custer County	pH	3/24/2011	35136
Cheyenne	Legion Lake	SD-CH-L-LEGION_01	Custer County	TSI	9/2/2008	35136
Cheyenne	Sheridan Lake	SD-CH-L-SHERIDAN_01	Pennington County	TSI	8/30/2006	31136
Cheyenne	Sheridan Lake	SD-CH-L-SHERIDAN_01	Pennington County	Mercury in Fish Tissue	8/18/2016	65871
Cheyenne	Stockade Lake	SD-CH-L-STOCKADE_01	Custer County	Mercury in Fish Tissue	8/18/2016	65870
Cheyenne	Sylvan Lake	SD-CH-L-SYLVAN_01	Custer County	TSI	9/1/2005	12351
Cheyenne	Sylvan Lake	SD-CH-L-SYLVAN_01	Custer County	pH (high)	8/18/2016	65861
Cheyenne	Battle Creek	SD-CH-R-BATTLE_01_USGS	Hwy 79 to mouth	*E. coli*/fecal coliform	2/18/2014	56640
Cheyenne	Battle Creek	SD-CH-R-BATTLE_02	Teepee Gulch Creek to SD HWY 79	*E. coli*/fecal coliform	2/18/2014	56641
Cheyenne	Beaver Creek	SD-CH-R-BEAVER_01	Wyoming border to Cheyenne River	Fecal coliform	3/12/2010	38253
Cheyenne	Beaver Creek	SD-CH-R-BEAVER_01_USGS	Near Buffalo Gap	Fecal coliform	9/26/2012	42518
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_03	Fall River to Cedar Creek	*E. coli*/fecal coliform	9/28/2010	39434/ 39429
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_04	Cedar Creek to Belle Fourche River	*E. coli*/fecal coliform	9/28/2010	39435/ 39430
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_05	Belle Fourche River to Bull Creek	*E. coli*/fecal coliform	9/28/2010	39436/ 39431
Cheyenne	Cheyenne River	SD-CH-R-CHEYENNE_06	Bull Creek to Lake Oahe	*E. coli*/fecal coliform	9/28/2010	39437/ 39432
Cheyenne	Rapid Creek	SD-CH-R-RAPID_03	Canyon Lake to S15, T1N, R8E	Fecal coliform	9/28/2010	39426
Cheyenne	Rapid Creek	SD-CH-R-RAPID_04	S15, T1N, R8E to above Farmingdale	Fecal coliform	9/28/2010	39427
Cheyenne	Rapid Creek	SD-CH-R-RAPID_05	Above Farmingdale to Cheyenne River	*E. coli*/fecal coliform	9/28/2010	39433/ 39428

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Cheyenne	Rapid Creek	SD-CH-R-RAPID_05	Above Farmingdale to Cheyenne River	TSS	9/27/2011	41087
Cheyenne	Spring Creek	SD-CH-R-SPRING_01	Headwaters to Sheridan Lake	Fecal coliform	12/11/2008	35790
Grand	Shadehill Reservoir	SD-GR-L-SHADEHILL_01	Perkins County	Mercury in Fish Tissue	3/1/2016	65407
James	Moccasin Creek		Aberdeen to Warner	Ammonia	3/19/2001	1581
James	Amsden Dam	SD-JA-L-AMSDEN_01	Day County	Mercury in Fish Tissue	3/1/2016	65408
James	Lake Byron	SD-JA-L-BYRON_01	Beadle County	Nutrients/Sediment-special approval	4/12/1999	618
James	Lake Carthage	SD-JA-L-CARTHAGE_01	Miner County	Mercury in Fish Tissue	3/1/2016	65409
James	Cattail Lake	SD-JA-L-CATTAIL_01	Marshall County (formerly SD-BS-L-CATTAIL_01)	Mercury in Fish Tissue	3/1/2016	65410
James	Lake Cavour	SD-JA-L-CAVOUR_01	Beadle County	Mercury in Fish Tissue	03/1/2016	65411
James	Clubhouse Lake	SD-JA-L-CLUBHOUSE_01	Marshall County	Mercury in Fish Tissue	8/18/2016	65868
James	Cottonwood Lake	SD-JA-L-COTTONWOOD_	Spink County	TSI	11/9/2001	2195
James	Cottonwood Lake	SD-JA-L-COTTONWOOD_01	Spink County	Mercury in Fish Tissue	3/1/2016	65413
James	Cresbard Lake	SD-JA-L-CRESBARD_01	Faulk County	TSI	12/3/2003	9745
James	Elm Lake	SD-JA-L-ELM_01	Brown County	TSI	4/12/1999	420
James	Elm Lake	SD-JA-L-ELM_01	Brown County	Mercury in Fish Tissue	3/1/2016	64512
James	Lake Faulkton	SD-JA-L-FAULKTON_01	Faulk County	TSI/Sediment	4/12/1999	623
James	Lake Faulkton	SD-JA-L-FAULKTON_01	Faulk County	Mercury in Fish Tissue	3/1/2016	65414
James	Lake Hanson	SD-JA-L-HANSON_01	Hanson County	TSI	6/3/2004	10623

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
James	Lake Hanson	SD-JA-L-HANSON_01	Hanson County	Mercury in Fish Tissue	3/1/2016	65415
James	Hazeldon Lake	SD-JA-L-HAZELDON_01	Day County	Mercury in Fish Tissue	3/1/2016	65420
James	Henry Reservoir	SD-JA-L-HENRY_01	Near Scotland, SD	Mercury in Fish Tissue	3/1/2016	65419
James	Horseshoe Lake	SD-JA-L-HORSESHOE_01	Marshall County	Mercury in Fish Tissue	3/1/2016	65421
James	Jones Lake	SD-JA-L-JONES_01	Hand County	TSI	4/2/2003	9747
James	Lardy Lake	SD-JA-L-LARDY_01	Day County (Formerly SD-BS-L-LARDY_01)	Mercury in Fish Tissue	3/1/2016	64503
James	Lilly Lake	SD-JA-L-LILY_01	Day County	Mercury in Fish Tissue	3/1/2016	65422
James	Lake Louise	SD-JA-L-LOUISE_01	Hand County	TSI	11/9/2001	2196
James	Lake Louise	SD-JA-L-LOUISE_01	Hand County	Mercury in Fish Tissue	3/1/2016	65423
James	Loyalton Dam	SD-JA-L-LOYALTON_01	Edmunds County	TSI	4/2/2003	9748
James	Lynn Lake	SD-JA-L-LYNN_01	Day County	Mercury in Fish Tissue	3/1/2016	65424
James	Middle Lynn Lake	SD-JA-L-MID_LYNN_01	Day County (formerly SD-BS-L-MID_LYNN_01)	Mercury in Fish Tissue	3/1/2016	64505
James	Mina Lake	SD-JA-L-MINA_01	Edmunds County	TSI	4/2/2003	9749
James	Mina Lake	SD-JA-L-MINA_01	Edmunds County	Mercury in Fish Tissue	3/1/2016	65425
James	Lake Mitchell	SD-JA-L-MITCHELL_01	Davison County	Nutrients-special approval	4/22/1997	2254
James	Opitz Lake	SD-JA-L-OPITZ_01	Day County (Formerly SD-BS-L-OPITZ_01)	Mercury in Fish Tissue	03/1/2016	64507
James	Ravine Lake	SD-JA-L-RAVINE_01	Beadle County	TSI/fecal coliform	4/12/1999	976
James	Ravine Lake	SD-JA-L-RAVINE_01	Beadle County	Mercury in Fish Tissue	3/1/2016	65426

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
James	Lake Redfield	SD-JA-L-REDFIELD_01	Spink County	Nutrients/Sediment-special approval	4/12/1999	645
James	Reetz Lake	SD-JA-L-REETZ_01	Day County	Mercury in Fish Tissue	3/1/2016	65427
James	Richmond Lake	SD-JA-L-RICHMOND_01	Brown County	TSI	8/8/2007	33708
James	Richmond Lake	SD-JA-L-RICHMOND_01	Brown County	Mercury in Fish Tissue	3/1/2016	65428
James	Rosehill Lake	SD-JA-L-ROSEHILL_01	Hand County	TSI	4/2/2003	9750
James	South Buffalo Lake	SD-JA-L-SOUTH_BUFFALO_01	Marshall County (formerly SD-BS-L-SOUTH_BUFFALO_01)	Mercury in Fish Tissue	3/1/2016	65429
James	Staum Dam	SD-JA-L-STAUM_01	Beadle County	Mercury in Fish Tissue	3/1/2016	65430
James	Wilmarth Lake	SD-JA-L-WILMARTH_01	Aurora County	Mercury in Fish Tissue	3/1/2016	65431
James	Dawson Creek	SD-JA-R-DAWSON_01	James River to Lake Henry	*E. coli*/fecal coliform	6/2/2011	40437
James	Firesteel Creek	SD-JA-R-FIRESTEEL_01	West Fork Firesteel to mouth	Nutrients-special approval	4/22/1997	641
James	James River	SD-JA-R-JAMES_08	Huron 3rd Street Dam to Sand Creek	Mercury in Fish Tissue	8/18/2016	65869
James	James River	SD-JA-R-JAMES_11	Yankton County line to mouth	Fecal coliform	3/24/2011	40029
James	Pierre Creek	SD-JA-R-PIERRE_01	James River to S11, T102N, R58W	Fecal coliform	9/29/2009	37333
James	Pierre Creek	SD-JA-R-PIERRE_01	James River to S11, T102N, R58W	*E. coli*	12/5/2011	41443
James	Wolf Creek	SD-JA-R-WOLF_02	Just above Wolf Creek Colony to mouth	TSS	8/8/2011	41061
Little Missouri	Little Missouri River	SD-LM-R-LITTLE_MISSOURI_01	Montana border to North Dakota border	Mercury in Fish Tissue	3/1/2016	65433
Minnesota	Lake Alice	SD-MN-L-ALICE_01	Deuel County	TSI	6/3/2004	10622

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Minnesota	Lake Alice	SD-MN-L-ALICE_01	Deuel County	Mercury in Fish Tissue	3/1/2016	65440
Minnesota	Big Stone Lake	SD-MN-L-BIG_STONE_01	Roberts County	Nutrients-special approval	12/26/1996	123
Minnesota	Fish Lake	SD-MN-L-FISH_01	Deuel County	TSI	9/29/2004	10971
Minnesota	Lake Hendricks	SD-MN-L-HENDRICKS_01	Brookings County	TSI/Sediment	4/12/1999	631
Minnesota	Lake Oliver	SD-MN-L-OLIVER_01	Deuel County	TSI	11/9/2001	2197
Minnesota	Punished Woman Lake	SD-MN-L-PUNISHED_WOMAN_01	Codington County	TSI/Sediment	2/7/2001	1621
Minnesota	Summit Lake	SD-MN-L-SUMMIT_01	Grant County	Mercury in Fish Tissue	3/1/2016	65441
Missouri	Brakke Dam	SD-MI-L-BRAKKE_01	Lyman County	TSI	9/29/2004	10967
Missouri	Brakke Dam	SD-MI-L-BRAKKE_01	Lyman County	Mercury in Fish Tissue	3/1/2016	65434
Missouri	Burke Lake	SD-MI-L-BURKE_01	Gregory County	DO/pH/TSI	8/8/2007	10983/ 33706/ 33706
Missouri	Byre Lake	SD-MI-L-BYRE_01	Lyman County	TSI	6/3/2004	10983
Missouri	Corsica Lake	SD-MI-L-CORSICA_01	Douglas County	TSI	8/30/2006	31143
Missouri	Cottonwood Lake	SD-MI-L-COTTONWOOD_01	Sully County	Mercury in Fish Tissue	3/1/2016	65435
Missouri	Dante Lake	SD-MI-L-DANTE_01	Charles Mix County	TSI/DO	9/27/2006	31192
Missouri	Fate Dam	SD-MI-L-FATE_01	Lyman County	TSI	1/14/2005	11380
Missouri	Fate Dam	SD-MI-L-FATE_01	Lyman County	Mercury in Fish Tissue	03/1/2016	65436
Missouri	Geddes Lake	SD-MI-L-GEDDES_01	Charles Mix County	TSI/DO	5/6/2008	34513
Missouri	Hiddenwood Lake	SD-MI-L-HIDDENWOOD_01	Walworth County	TSI/Sediment	4/12/1999	632
Missouri	Lake Hurley	SD-MI-L-HURLEY_01	Potter County	Mercury in Fish Tissue	3/1/2016	64513
Missouri	McCook Lake	SD-MI-L-MCCOOK_01	Union County	TSI	4/12/1999	770

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Missouri	Roosevelt Lake	SD-MI-L-ROOSEVELT_01	Tripp County	Mercury in Fish Tissue	3/01/2016	64514
Missouri	Choteau Creek	SD-MI-R-CHOTEAU_01	Lewis & Clark Lake to S34, T96N, R63W	TSS	5/3/2010	38613
Missouri	Emanuel Creek	SD-MI-R-EMANUEL_01	Lewis and Clark Lake to S20, T94N, R60W	*E. coli*	8/10/2011	41068
Missouri	Emanuel Creek	SD-MI-R-EMANUEL_01	Lewis and Clark Lake to S20, T94N, R60W	Fecal coliform/TSS	9/29/2009	37330/ 37331
Missouri	Medicine Creek	SD-MI-R-MEDICINE_01	Lake Sharpe to US Hwy 83	Fecal coliform/TSS	8/30/2006	31146
Missouri	Missouri River (Lake Oahe)	SD-MI-R-OAHE_01	North Dakota border to Oahe Dam	Mercury in Fish Tissue	3/1/2016	65439
Missouri	Ponca Creek	SD-MI-R-PONCA_01	SD/NE border to US Hwy 183	Fecal coliform	8/2/2010	39029
Missouri	Ponca Creek	SD-MI-R-PONCA_01	SD/NE border to US Hwy 183	TSS	4/27/2010	38463
Missouri	Missouri River (Sharpe)	SD-MI-R-SHARPE_01	Oahe Dam to Big Bend Dam	Sediment	2/7/2001	1537
Moreau	Coal Springs Reservoir	SD-MU-L-COAL_SPRINGS_01	Perkins County	Mercury in Fish Tissue	3/1/2016	64515
Moreau	Little Moreau No. 1	SD-MU-L-LITTLE_MOREAU_NO1_01	Dewey County	Mercury in Fish Tissue	3/1/2016	65442
Niobrara	Keya Paha River	SD-NI-R-KEYA_PAHA_01	Keya Paha to NE border	*E. coli*	9/22/2011	41085
Niobrara	Keya Paha River	SD-NI-R-KEYA_PAHA_01	Keya Paha to NE border	TSS	9/29/2009	37332
Niobrara	Keya Paha River	SD-NI-R-KEYA_PAHA_01	Keya Paha to NE border	Fecal coliform	2/1/2010	38214
Red River	White Lake	SD-RD-L-WHITE_01	Marshall County	DO/TSI	8/20/2006	31133
Vermillion	Turkey Ridge Creek		Vermillion River to S31, T98N, R53W	Fecal coliform	9/27/2006	31212
Vermillion	East Vermillion Lake	SD-VM-L-E_VERMILLION_01	McCook County	Mercury in Fish Tissue	3/1/2016	65443

River Basin	Waterbody	AUID	Segment or Lake Location	Impairment	TMDL Approved	TMDL ID
Vermillion	Lake Henry	SD-VM-L-HENRY_01	Kingsbury County	Mercury in Fish Tissue	3/1/2016	65444
Vermillion	Swan Lake	SD-VM-L-SWAN_01	Turner County	TSI/Sediment	4/12/1999	1169/ 1168
Vermillion	Lake Thompson	SD-VM-L-THOMPSON_01	Kingsbury County	Mercury in Fish Tissue	3/1/2016	65445
Vermillion	Whitewood Lake	SD-VM-L-WHITEWOOD_01	Kingsbury County	Mercury in Fish Tissue	3/1/2016	65446
Vermillion	Vermillion River	SD-VM-R-VERMILLION_02	Turkey Ridge Creek to Baptist Creek	TSS	9/27/2010	39404
Vermillion	Vermillion River	SD-VM-R-VERMILLION_03	Baptist Creek to mouth	TSS	7/5/2011	40439
Vermillion	East Fork Vermillion River	SD-VM-R-VERMILLION_EAST_FORK_01	McCook/Lake County to Little Vermillion River	Fecal coliform	9/26/2012	42525

APPENDIX B

DENR 2018 WATERBODY DELISTING REPORT

AUID	Name	Location	Cause	Delisting Reason
SD-BA-R-BAD_01	Bad River	Stanley County line to mouth	Specific Conductivity	Applicable WQS attained; based on new data
SD-BF-R-BELLE_FOURCHE_01	Belle Fourche River	Wyoming border to Redwater River	Escherichia Coli	TMDL Approved or established by EPA (4a)
SD-BF-R-HORSE_01_USGS	Horse Creek	Indian Creek to mouth	Total Suspended Solids	TMDL Approved or established by EPA (4a)
SD-BF-R-WHITEWOOD_04	Whitewood Creek	Spruce Gulch to Sandy Creek	Fecal Coliform	WQS no longer applicable
SD-BS-R-BIG_SIOUX_04	Big Sioux River	Stray Horse Creek to near Volga	Escherichia Coli	Applicable WQS attained; reason for recovery unspecified
SD-BS-R-SIXMILE_01	Six Mile Creek	Big Sioux River to S30, T112N, R48W	Fecal Coliform	WQS no longer applicable
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	Salinity	Applicable WQS attained; based on new data
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	Total Dissolved Solids	Applicable WQS attained; based on new data
SD-CH-R-SPRING_01	Spring Creek	S5, T2S, R3E to Sheridan Lake	Total Suspended Solids	Applicable WQS attained; based on new data
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	Escherichia Coli	Applicable WQS attained; based on new data
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Escherichia Coli	Applicable WQS attained; based on new data
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	Fecal Coliform	WQS no longer applicable
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	Fecal Coliform	WQS no longer applicable
SD-JA-R-JAMES_01	James River	North Dakota border to Mud Lake Reservoir	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-JAMES_03	James River	Columbia Road Reservoir	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-JAMES_05	James River	US HWY 12 to Mud Creek	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-JAMES_06	James River	Mud Creek to James River Diversion Dam	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-JAMES_07	James River	James River Diversion Dam to Huron 3rd Street Dam	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-MOCCASIN_02	Moccasin Creek	James River to S24, T123N, R64W	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-SNAKE_01	Snake Creek	James River to confluence with SF Snake Creek	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-JA-R-WOLF_01	Wolf Creek	Wolf Creek Colony to S5, T103N, R56W	Fecal Coliform	WQS no longer applicable

AUID	Name	Location	Cause	Delisting Reason
SD-JA-R-WOLF_02	Wolf Creek	Just above Wolf Creek Colony to the mouth.	Fecal Coliform	WQS no longer applicable
SD-MI-R-LEWIS_AND_CLARK_01	Missouri River (Lewis and Clark Lake)	Fort Randall Dam to North Sioux City	Mercury In Fish Tissue	Applicable WQS attained; based on new data
SD-MN-R-LITTLE_MINNESOTA_02	Little Minnesota River	S24, T126N, R51W to S15, T128N, R52W	Dissolved Oxygen	Applicable WQS attained; based on new data
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	Fecal Coliform	WQS no longer applicable
SD-VM-R-LONG_01	Long Creek	Vermillion River to Highway 44	Fecal Coliform	WQS no longer applicable
SD-VM-R-VERMILLION_WEST_FORK_01_USGS	West Fork Vermillion River	Vermillion River to McCook-Miner County Line	Fecal Coliform	WQS no longer applicable
SD-WH-R-LITTLE_WHITE_01	Little White River	Rosebud Creek to mouth	Fecal Coliform	WQS no longer applicable
SD-WH-R-WHITE_02	White River	Willow Creek to Pass Creek	Fecal Coliform	WQS no longer applicable
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	Fecal Coliform	WQS no longer applicable
SD-WH-R-WHITE_04	White River	Little White River to confluence with Missouri River	Fecal Coliform	WQS no longer applicable

APPENDIX C

AUIDs Where Fecal Coliform Was Removed as a Cause

Fecal Coliform Removed from AUIDs		
SD-BF-R-WHITEWOOD_03	SD-BS-R-SIXMILE_01	SD-GR-R-GRAND_03
SD-BF-R-WHITEWOOD_04	SD-BS-R-SKUNK_01	SD-GR-R-GRAND_S_FORK_01
SD-BS-R-BEAVER_01	SD-BS-SPLIT_ROCK_01_USGS	SD-JA-R-DAWSON_01
SD-BS-R-BEAVER_02	SD-BS-R-SPRING_01	SD-JA-R-PIERRE_01
SD-BS-R-BIG_SIOUX_08	SD-BS-R-STRAYHORSE_01	SD-JA-R-WOLF_01
SD-BS-R-BIG_SIOUX_10	SD-BS-R-UNION_01	SD-JA-R-WOLF_02
SD-BS-R-BIG_SIOUX_11	SD-BS-R-WILLOW_01	SD-MI-R-EMANUEL_01
SD-BS-R-BIG_SIOUX_12	SD-CH-R-BATTLE_01_USGS	SD-MI-R-PONCA_01
SD-BS-R-BIG_SIOUX_13	SD-CH-R-BATTLE_02	SD-MU-R-MOREAU_03
SD-BS-R-BIG_SIOUX_14	SD-CH-R-BEAVER_01_USGS	SD-NI-R-KEYA_PAHA_01
SD-BS-R-BIG_SIOUX_15	SD-CH-R-CHEYENNE_03	SD-VM-R-LONG_01
SD-BS-R-BIG_SIOUX_16	SD-CH-R-CHEYENNE_04	SD-VM-R-VERMILLION_E_FORK_01
SD-BS-R-BIG_SIOUX_17	SD-CH-R-CHEYENNE_05	SD-VM-VERMILLION_WEST_FORK_01_USGS
SD-BS-R-EAST_BRULE_01	SD-CH-R-CHEYENNE_06	SD-WH-R-LITTLE_WHITE_01
SD-BS-R-HIDEWOOD_01	SD-CH-R-RAPID_04	SD-WH-R-WHITE_02
SD-BS-PEG_MUNKY_RUN_01	SD-CH-R-RAPID_05	SD-WH-R-WHITE_03
SD-BS-R-PIPESTONE_01	SD-CH-R-SPRING_01	SD-WH-R-WHITE_04

APPENDIX D

303(D) SUMMARY

AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	CHLOROPHYLL-A	2014	2029	Low
SD-BA-L-FREEMAN_01	Freeman Lake	Jackson County	DISSOLVED OXYGEN	2010	2029	Low
SD-BA-L-MURDO_01	Murdo Dam	Jones County	DISSOLVED OXYGEN	2012	2024	Low
SD-BA-L-MURDO_01	Murdo Dam	Jones County	MERCURY IN FISH TISSUE	2016	2029	Low
SD-BA-L-WAGGONER_01	Waggoner Lake	Haakon County	CHLOROPHYLL-A	2010	2020	Low
SD-BA-R-BAD_01	Bad River	Stanley County line to mouth	ESCHERICHIA COLI	2016	2029	High
SD-BA-R-BAD_01	Bad River	Stanley County line to mouth	TOTAL SUSPENDED SOLIDS	2004	2030	High
SD-BF-L-IRON_CREEK_01	Iron Creek Lake	Lawrence County	TEMPERATURE	2010	2022	Low
SD-BF-L-MIRROR_EAST_01	Mirror Lake East	Lawrence County	TEMPERATURE	2006	2018	Low
SD-BF-L-MIRROR_WEST_01	Mirror Lake West	Lawrence County	TEMPERATURE	2008	2020	Low
SD-BF-L-NEWELL_CITY_01	Newell City Pond	Butte County	TEMPERATURE	2010	2022	Low
SD-BF-R-BELLE_FOURCHE_03	Belle Fourche River	Whitewood Creek to Willow Creek	ESCHERICHIA COLI	2016	2029	High
SD-BF-R-DEADWOOD_01	Deadwood Creek	Rutabaga Gulch to Whitewood Creek	ESCHERICHIA COLI	2014	2018	High
SD-BF-R-HORSE_01_USGS	Horse Creek	Indian Creek to mouth	ESCHERICHIA COLI	2016	2029	High
SD-BF-R-WHITEWOOD_02	Whitewood Creek	Gold Run Creek to Deadwood Creek	ESCHERICHIA COLI	2018	2030	Low
SD-BF-R-WHITEWOOD_04	Whitewood Creek	Spruce Gulch to Sandy Creek	ESCHERICHIA COLI	2012	2024	High
SD-BF-R-WHITEWOOD_05	Whitewood Creek	Sandy Creek to I-90	PH (High)	2006	2018	Low
SD-BF-R-WHITEWOOD_06	Whitewood Creek	I-90 to Crow Creek	ESCHERICHIA COLI	2014	2019	High
SD-BF-R-WHITEWOOD_06	Whitewood Creek	I-90 to Crow Creek	PH (High)	2008	2020	Low
SD-BF-R-WHITEWOOD_07	Whitewood Creek	Crow Creek to mouth	ESCHERICHIA COLI	2016	2029	High
SD-BF-R-WHITEWOOD_07	Whitewood Creek	Crow Creek to mouth	TOTAL SUSPENDED SOLIDS	2010	2022	High
SD-BS-L-ALBERT_01	Lake Albert	Kingsbury County	DISSOLVED OXYGEN	2014	2029	Low
SD-BS-L-BLUE_DOG_01	Blue Dog Lake	Day County	PH (High)	2016	2022	Low
SD-BS-L-BULLHEAD_01	Bullhead Lake	Deuel County	CHLOROPHYLL-A	2010	2022	Low
SD-BS-L-MINNEWASTA_01	Minnewasta Lake	Day County	CHLOROPHYLL-A	2014	2021	Low
SD-BS-L-WAUBAY_01	Waubay Lake	Day County	CHLOROPHYLL-A	2014	2029	Low
SD-BS-R-BEAVER_02	Beaver Creek	Split Rock Creek to South Dakota-Minnesota border	ESCHERICHIA COLI	2014	2021	Low
SD-BS-R-BIG_SIOUX_01	Big Sioux River	S28, T121N, R52W to Lake Kampeska	DISSOLVED OXYGEN	2004	2015	High
SD-BS-R-BIG_SIOUX_01	Big Sioux River	S28, T121N, R52W to Lake Kampeska	ESCHERICHIA COLI	2010	2014	High
SD-BS-R-BIG_SIOUX_02	Big Sioux River	Lake Kampeska to Willow Creek	DISSOLVED OXYGEN	2014	2029	Low

AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-BS-R-BIG_SIOUX_02	Big Sioux River	Lake Kampeska to Willow Creek	ESCHERICHIA COLI	2016	2029	High
SD-BS-R-BIG_SIOUX_04	Big Sioux River	Stray Horse Creek to near Volga	TOTAL SUSPENDED SOLIDS	2018	2030	Low
SD-BS-R-BIG_SIOUX_05	Big Sioux River	Near Volga to Brookings	TOTAL SUSPENDED SOLIDS	2004	2022	High
SD-BS-R-BIG_SIOUX_06	Big Sioux River	Brookings to Brookings/Moody County Line	TOTAL SUSPENDED SOLIDS	2004	2022	High
SD-BS-R-BIG_SIOUX_07	Big Sioux River	Brookings/Moody County Line to S2, T104N, R49W	ESCHERICHIA COLI	2016	2029	High
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Above Brandon to Nine Mile Creek	ESCHERICHIA COLI	2012	2014	High
SD-BS-R-BIG_SIOUX_13	Big Sioux River	Above Brandon to Nine Mile Creek	TOTAL SUSPENDED SOLIDS	2004	2022	High
SD-BS-R-BIG_SIOUX_14	Big Sioux River	Nine Mile Creek to near Fairview	TOTAL SUSPENDED SOLIDS	2004	2020	High
SD-BS-R-BRULE_01	Brule Creek	Big Sioux River to confluence of its east and west forks	ESCHERICHIA COLI	2014	2018	High
SD-BS-R-BRULE_01	Brule Creek	Big Sioux River to confluence of its east and west forks	TOTAL SUSPENDED SOLIDS	2018	2030	Low
SD-BS-R-EAST_BRULE_01	East Brule Creek	confluence with Brule Creek to S3, T95N, R49W	TOTAL SUSPENDED SOLIDS	2008	2009	High
SD-BS-R-FLANDREAU_01	Flandreau Creek	Big Sioux River to Minnesota Border	ESCHERICHIA COLI	2014	2029	High
SD-BS-R-SIXMILE_01	Six Mile Creek	Big Sioux River to S30, T112N, R48W	ESCHERICHIA COLI	2014	2020	High
SD-BS-R-SKUNK_01	Skunk Creek	Brandt Lake to Big Sioux River	ESCHERICHIA COLI	2014	2018	High
SD-BS-R-SPLIT_ROCK_01_USGS	Split Rock Creek	West Pipestone Creek to Big Sioux River	ESCHERICHIA COLI	2018	2030	Low
SD-BS-R-UNION_01	Union Creek	Big Sioux River to confluence with East and West Forks	TOTAL SUSPENDED SOLIDS	2008	2010	High
SD-BS-R-WILLOW_01	Willow Creek	Big Sioux River to S7, T117N, R50W	DISSOLVED OXYGEN	2018	2030	Low
SD-BS-R-WILLOW_01	Willow Creek	Big Sioux River to S7, T117N, R50W	ESCHERICHIA COLI	2018	2030	Low
SD-CH-L-CENTER_01	Center Lake	Custer County	TEMPERATURE	2008	2020	Low
SD-CH-L-COLD_BROOK_01	Cold Brook Reservoir	Fall River County	TEMPERATURE	2006	2018	Low
SD-CH-L-DEERFIELD_01	Deerfield Lake	Pennington County	TEMPERATURE	2010	2022	Low
SD-CH-L-NEW_WALL_01	New Wall Lake	Pennington County	MERCURY IN FISH TISSUE	2018	2020	High
SD-CH-L-NEW_WALL_01	New Wall Lake	Pennington County	PH (High)	2010	2022	Low
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	TEMPERATURE	2006	2018	Low
SD-CH-L-SHERIDAN_01	Sheridan Lake	Pennington County	DISSOLVED OXYGEN	2006	2029	Low
SD-CH-L-SYLVAN_01	Sylvan Lake	Custer County	TEMPERATURE	2008	2020	Low
SD-CH-R-BEAVER_01	Beaver Creek	WY border to Cheyenne River	SALINITY/SAR	2006	2029	Low
SD-CH-R-BEAVER_01	Beaver Creek	WY border to Cheyenne River	SPECIFIC CONDUCTIVITY	2004	2010	Low
SD-CH-R-BEAVER_01	Beaver Creek	WY border to Cheyenne River	TOTAL DISSOLVED SOLIDS	2004	2010	Low
SD-CH-R-BOX_ELDER_01	Box Elder Creek	Cheyenne River to S22, T2N, R8E	ESCHERICHIA COLI	2016	2029	High
SD-CH-R-CHERRY_01	Cherry Creek	Cheyenne River to Sulphur Creek	SPECIFIC CONDUCTIVITY	2018	2030	Low

AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	SALINITY/SAR	2014	2029	Low
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	SPECIFIC CONDUCTIVITY	2004	2029	Low
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	TOTAL DISSOLVED SOLIDS	2004	2029	Low
SD-CH-R-CHEYENNE_01	Cheyenne River	WY border to Beaver Creek	TOTAL SUSPENDED SOLIDS	2012	2024	High
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	ESCHERICHIA COLI	2014	2022	Low
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	SPECIFIC CONDUCTIVITY	2004	2013	High
SD-CH-R-CHEYENNE_02	Cheyenne River	Beaver Creek to Cascade Creek	TOTAL SUSPENDED SOLIDS	2004	2022	High
SD-CH-R-CHEYENNE_02B	Cheyenne River	Cascade Creek to Angostura Reservoir	TOTAL SUSPENDED SOLIDS	2018	2030	Low
SD-CH-R-CHEYENNE_03	Cheyenne River	Fall River to Cedar Creek	TOTAL SUSPENDED SOLIDS	2004	2013	High
SD-CH-R-CHEYENNE_04	Cheyenne River	Cedar Creek to Belle Fourche River	TOTAL SUSPENDED SOLIDS	2004	2013	High
SD-CH-R-CHEYENNE_05	Cheyenne River	Belle Fourche River to Bull Creek	TOTAL SUSPENDED SOLIDS	2004	2013	High
SD-CH-R-CHEYENNE_06	Cheyenne River	Bull Creek to Lake Oahe	TOTAL SUSPENDED SOLIDS	2004	2013	High
SD-CH-R-ELK_01_USGS	Elk Creek	S9, T3N, R7E to S27, T4N, R3E	ESCHERICHIA COLI	2018	2030	Low
SD-CH-R-FALL_01	Fall River	Hot Springs to mouth	TEMPERATURE	2004	2029	low
SD-CH-R-HIGHLAND_01_USGS	Highland Creek	Wind Cave Natl Park and near Pringle, SD	PH (High)	2006	2018	Low
SD-CH-R-HIGHLAND_01_USGS	Highland Creek	Wind Cave Natl Park and near Pringle, SD	TEMPERATURE	2006	2018	Low
SD-CH-R-HORSEHEAD_01_USGS	Horsehead Creek	At Oelrichs	SPECIFIC CONDUCTIVITY	2004	2029	low
SD-CH-R-RAPID_03	Rapid Creek	Canyon Lake to S15, T1N, R8E	ESCHERICHIA COLI	2018	2030	Low
SD-CH-R-RAPID_04	Rapid Creek	S15, T1N, R8E to above Farmingdale	ESCHERICHIA COLI	2014	2022	Low
SD-CH-R-SPRING_01	Spring Creek	S5, T2S, R3E to Sheridan Lake	ESCHERICHIA COLI	2014	2021	High
SD-CH-R-VICTORIA_01_USGS	Victoria Creek	Rapid Creek to S19, T1N, R6E	TEMPERATURE	2016	2011	Low
SD-GR-L-EAST_LEMMON_01	East Lemmon Lake	Perkins County	MERCURY IN FISH TISSUE	2018	2030	Low
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	CHLOROPHYLL-A	2010	2022	Low
SD-GR-L-ISABEL_01	Lake Isabel	Dewey County	MERCURY IN FISH TISSUE	2016	2029	Low
SD-GR-L-PUDWELL_01	Pudwell Dam	Corson County	MERCURY IN FISH TISSUE	2016	2029	Low
SD-GR-L-SHADEHILL_01	Shadehill Reservoir	Perkins County	SALINITY/SAR	2004	2015	Low
SD-GR-R-BULL_01	Bull Creek	SF Grand River to S15, T21N, R5E	ESCHERICHIA COLI	2016	2029	low
SD-GR-R-BULL_01	Bull Creek	SF Grand River to S15, T21N, R5E	SALINITY/SAR	2012	2024	Low
SD-GR-R-CROOKED_01	Crooked Creek	ND border to S34, T23N, R5E	SALINITY/SAR	2012	2024	Low
SD-GR-R-CROOKED_01	Crooked Creek	ND border to S34, T23N, R5E	SPECIFIC CONDUCTIVITY	2014	2029	Low
SD-GR-R-GRAND_01	Grand River	Shadehill Reservoir to Corson County line	SALINITY/SAR	2016	2011	Low

AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-GR-R-GRAND_01	Grand River	Shadehill Reservoir to Corson County line	TEMPERATURE	2004	2017	Low
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	SALINITY/SAR	2004	2017	Low
SD-GR-R-GRAND_02	Grand River	Corson County line to Bullhead	TOTAL SUSPENDED SOLIDS	2004	2017	Low
SD-GR-R-GRAND_03	Grand River	Bullhead to mouth	TOTAL SUSPENDED SOLIDS	2004	2011	Low
SD-GR-R-GRAND_N_FORK_01	Grand River, North Fork	North Dakota border to Shadehill Reservoir	ESCHERICHIA COLI	2018	2030	Low
SD-GR-R-GRAND_N_FORK_01	Grand River, North Fork	North Dakota border to Shadehill Reservoir	SALINITY/SAR	2004	2015	Low
SD-GR-R-GRAND_N_FORK_01	Grand River, North Fork	North Dakota border to Shadehill Reservoir	SPECIFIC CONDUCTIVITY	2018	2030	Low
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	ESCHERICHIA COLI	2016	2029	low
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	SALINITY/SAR	2006	2018	Low
SD-GR-R-GRAND_S_FORK_01	Grand River, South Fork	S13, T18N, R3E to SD Hwy 79	TOTAL SUSPENDED SOLIDS	2004	2011	Low
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	ESCHERICHIA COLI	2016	2029	low
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	SALINITY/SAR	2004	2011	Low
SD-GR-R-GRAND_S_FORK_02	Grand River, South Fork	SD Hwy 79 to Shadehill Reservoir	TOTAL SUSPENDED SOLIDS	2004	2011	Low
SD-JA-L-BIERMAN_01	Bierman Dam	Spink County	CHLOROPHYLL-A	2010	2022	Low
SD-JA-L-BYRON_01	Lake Byron	Beadle County	PH (High)	2010	2022	Low
SD-JA-L-CARTHAGE_01	Lake Carthage	Miner County	CHLOROPHYLL-A	2010	2022	Low
SD-JA-L-CRESBARD_01	Cresbard Lake	Faulk County	PH (High)	2010	2022	Low
SD-JA-L-FAULKTON_01	Lake Faulkton	Faulk County	DISSOLVED OXYGEN	2018	2031	Low
SD-JA-L-FOUR_MILE_01	Four Mile Lake	Marshall County (formerly SD-BS-L-FOUR_MILE_01)	PH (High)	2012	2024	Low
SD-JA-L-JONES_01	Jones Lake	Hand County	PH (High)	2006	2018	Low
SD-JA-L-LATHAM_01	Latham	Faulk County	DISSOLVED OXYGEN	2012	2024	Low
SD-JA-L-LOUISE_01	Lake Louise	Hand County	DISSOLVED OXYGEN	2014	2029	Low
SD-JA-L-LOUISE_01	Lake Louise	Hand County	PH (High)	2008	2020	Low
SD-JA-L-MINA_01	Mina Lake	Edmunds County	DISSOLVED OXYGEN	2012	2025	Low
SD-JA-L-MITCHELL_01	Lake Mitchell	Davison County	TEMPERATURE	2018	2031	Low
SD-JA-L-NINE_MILE_01	Nine Mile Lake	Marshall County (formerly SD-BS-L-NINE_MILE_01)	PH (High)	2010	2022	Low
SD-JA-L-PIERPONT_01	Pierpont Lake	Day County	TEMPERATURE	2012	2024	Low
SD-JA-L-RAVINE_01	Ravine Lake	Beadle County	DISSOLVED OXYGEN	2012	2024	Low
SD-JA-L-REDFIELD_01	Lake Redfield	Spink County	DISSOLVED OXYGEN	2010	2022	Low
SD-JA-L-ROSETTE_01	Rosette Lake	Edmunds County	CHLOROPHYLL-A	2014	2021	Low
SD-JA-L-ROY_01	Roy Lake	Marshall County (formerly SD-BS-L-ROY_01)	MERCURY IN FISH TISSUE	2018	2020	High

AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-JA-L-S_RED_IRON_01	South Red Iron Lake	Marshall County (formerly SD-BS-L-S_RED_IRON_01)	TEMPERATURE	2014	2029	Low
SD-JA-L-SOUTH_BUFFALO_01	South Buffalo Lake	Marshall County (formerly SD-BS-L-SOUTH_BUFFALO_01)	DISSOLVED OXYGEN	2010	2022	Low
SD-JA-L-TWIN_01	Twin Lakes	Sanborn County	CHLOROPHYLL-A	2010	2022	Low
SD-JA-L-TWIN_01	Twin Lakes	Sanborn County	DISSOLVED OXYGEN	2016	2029	low
SD-JA-L-WILMARTH_01	Wilmarth Lake	Aurora County	PH (High)	2012	2024	Low
SD-JA-R-ELM_01	Elm River	Elm Lake to mouth	TOTAL DISSOLVED SOLIDS	2018	2030	Low
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	ESCHERICHIA COLI	2010	2022	High
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	TEMPERATURE	2004	2029	High
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	TOTAL DISSOLVED SOLIDS	2004	2029	High
SD-JA-R-FIRESTEEL_01	Firesteel Creek	West Fork Firesteel Creek to mouth	TOTAL SUSPENDED SOLIDS	2018	2030	Low
SD-JA-R-FOOT_01_USGS	Foot Creek	Near Aberdeen, SD	DISSOLVED OXYGEN	2012	2016	Low
SD-JA-R-JAMES_02	James River	Mud Lake Reservoir	TOTAL SUSPENDED SOLIDS	2018	2030	Low
SD-JA-R-JAMES_03	James River	Columbia Road Reservoir	TOTAL SUSPENDED SOLIDS	2016	2029	High
SD-JA-R-JAMES_04	James River	Columbia Road Reservoir to near US HWY 12	DISSOLVED OXYGEN	2012	2016	Low
SD-JA-R-JAMES_04	James River	Columbia Road Reservoir to near US HWY 12	TOTAL SUSPENDED SOLIDS	2016	2029	High
SD-JA-R-JAMES_07	James River	James River Diversion Dam to Huron 3rd Street Dam	TOTAL DISSOLVED SOLIDS	2014	2029	Low
SD-JA-R-JAMES_09	James River	Sand Creek to I-90	TOTAL SUSPENDED SOLIDS	2004	2009	High
SD-JA-R-JAMES_11	James River	Yankton County line to mouth	TOTAL SUSPENDED SOLIDS	2004	2009	High
SD-JA-R-JAMES_11	James River	Yankton County line to mouth	ESCHERICHIA COLI	2016	2029	High
SD-JA-R-MOCCASIN_02	Moccasin Creek	James River to S24, T123N, R64W	ESCHERICHIA COLI	2018	2030	Low
SD-JA-R-MUD_01	Mud Creek	James River to Hwy 37	DISSOLVED OXYGEN	2006	2018	Low
SD-JA-R-WOLF_01	Wolf Creek	Wolf Creek Colony to S5, T103N, R56W	ESCHERICHIA COLI	2012	2014	High
SD-JA-R-WOLF_02	Wolf Creek	Just above Wolf Creek Colony to the mouth.	ESCHERICHIA COLI	2012	2017	High
SD-LM-R-LITTLE_MISSOURI_01	Little Missouri River	Montana border to North Dakota border	TOTAL SUSPENDED SOLIDS	2010	2022	High
SD-MI-L-ANDES_01	Lake Andes	Charles Mix County	DISSOLVED OXYGEN	2006	2011	Low
SD-MI-L-ANDES_01	Lake Andes	Charles Mix County	PH (High)	2018	2031	Low
SD-MI-L-CAMPBELL_01	Lake Campbell	Campbell County	PH (High)	2010	2022	Low
SD-MI-L-CORSICA_01	Corsica Lake	Douglas County	PH (High)	2008	2029	Low
SD-MI-L-DANTE_01	Dante Lake	Charles Mix County	TEMPERATURE	2014	2029	Low
SD-MI-L-HIDDENWOOD_01	Lake Hiddenwood	Walworth County	DISSOLVED OXYGEN	2012	2024	Low

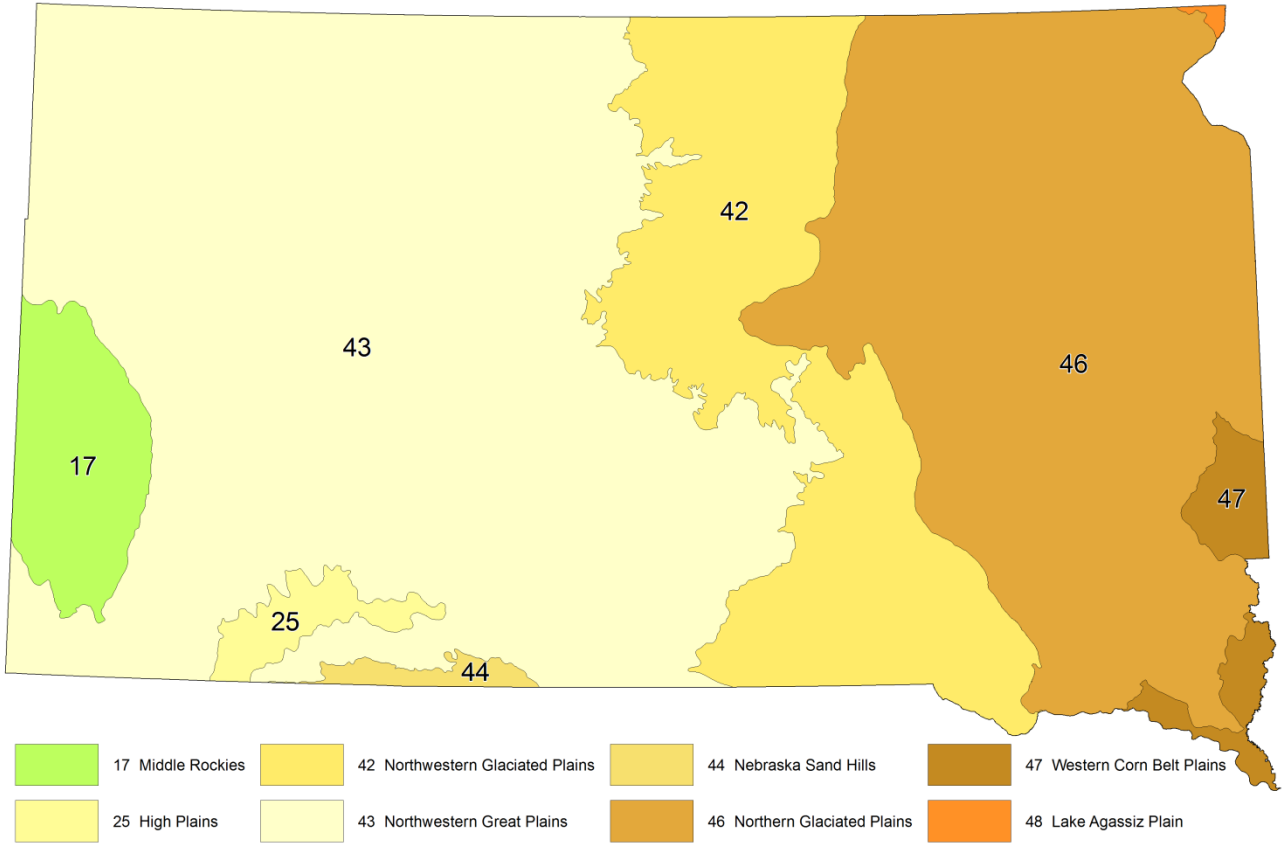
AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-MI-L-MCCOOK_01	McCook Lake	Union County	TEMPERATURE	2010	2022	Low
SD-MI-L-POCASSE_01	Lake Pocasse	Campbell County	CHLOROPHYLL-A	2010	2022	Low
SD-MI-L-ROOSEVELT_01	Roosevelt Lake	Tripp County	DISSOLVED OXYGEN	2018	2031	Low
SD-MI-R-CROW_01	Crow Creek	Bedashosha Lake to Jerauld County line	ESCHERICHIA COLI	2016	2029	High
SD-MI-R-CROW_01	Crow Creek	Bedashosha Lake to Jerauld County line	TOTAL SUSPENDED SOLIDS	2016	2029	High
SD-MI-R-MEDICINE_01	Medicine Creek	Lake Sharpe to US Hwy 83	ESCHERICHIA COLI	2016	2029	High
SD-MI-R-MEDICINE_01	Medicine Creek	Lake Sharpe to US Hwy 83	SPECIFIC CONDUCTIVITY	2004	2029	Low
SD-MI-R-MEDICINE_01	Medicine Creek	Lake Sharpe to US Hwy 83	TOTAL DISSOLVED SOLIDS	2018	2030	Low
SD-MI-R-PONCA_01	Ponca Creek	SD/NE border to US Hwy 183	ESCHERICHIA COLI	2016	2029	High
SD-MI-R-SHARPE_01	Missouri River (Lake Sharpe)	Oahe Dam to Big Bend Dam	DISSOLVED OXYGEN	2016	2029	Low
SD-MI-R-SHARPE_01	Missouri River (Lake Sharpe)	Oahe Dam to Big Bend Dam	TEMPERATURE	2010	2029	High
SD-MI-R-SPRING_01	Spring Creek	Lake Pocasse to US HWY 83	DISSOLVED OXYGEN	2006	2018	Low
SD-MN-L-BIG_STONE_01	Big Stone Lake	Roberts County	TEMPERATURE	2012	2024	Low
SD-MN-L-HENDRICKS_01	Lake Hendricks	Brookings County	PH (High)	2010	2022	Low
SD-MN-L-PUNISHED_WOMAN_01	Punished Woman Lake	Codington County	PH (High)	2012	2024	Low
SD-MN-R-LAC_QUI_PARLE_W_BR_01	Lac Qui Parle River, West Branch	SD/MN border to S8, T115N, R47W	ESCHERICHIA COLI	2016	2029	High
SD-MN-R-MUD_01	Mud Creek	SF Yellowbank River to S22, T118N, R48W	DISSOLVED OXYGEN	2012	2022	Low
SD-MN-R-WHETSTONE_S_FORK_01	South Fork Whetstone River	Headwaters to Lake Farley	ESCHERICHIA COLI	2012	2014	High
SD-MN-R-WHETSTONE_S_FORK_02	South Fork Whetstone River	Lake Farley to mouth	ESCHERICHIA COLI	2012	2014	High
SD-MN-R-YELLOW_BANK_N_FORK_01	North Fork Yellow Bank River	SD/MN border to S27, T120N, R48W	ESCHERICHIA COLI	2012	2014	High
SD-MN-R-YELLOW_BANK_S_FORK_01	South Fork Yellow Bank River	SD/MN border to S33, T118N, R49W	ESCHERICHIA COLI	2012	2014	High
SD-MU-L-COAL_SPRINGS_01	Coal Springs Reservoir	Perkins County	PH (High)	2012	2024	Low
SD-MU-R-MOREAU_01	Moreau River	North and South Forks to Ziebach/Perkins county line	ESCHERICHIA COLI	2016	2029	Low
SD-MU-R-MOREAU_01	Moreau River	North and South Forks to Ziebach/Perkins county line	SALINITY/SAR	2016	2011	Low
SD-MU-R-MOREAU_01	Moreau River	North and South Forks to Ziebach/Perkins county line	TOTAL SUSPENDED SOLIDS	2006	2018	Low
SD-MU-R-MOREAU_02	Moreau River	Ziebach/Perkins county line to Green Grass	SALINITY/SAR	2016	2011	Low
SD-MU-R-MOREAU_02	Moreau River	Ziebach/Perkins county line to Green Grass	TOTAL SUSPENDED SOLIDS	2016	2011	Low
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	ESCHERICHIA COLI	2010	2022	Low
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	SALINITY/SAR	2018	2030	Low
SD-MU-R-MOREAU_03	Moreau River	Green Grass to mouth	TOTAL SUSPENDED SOLIDS	2004	2011	Low

AUID	Waterbody Name	Location Description	Cause	Year First Listed	TMDL Schedule	TMDL Priority
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	SALINITY/SAR	2014	2029	Low
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	SPECIFIC CONDUCTIVITY	2016	2011	Low
SD-MU-R-MOREAU_S_FORK_01	South Fork Moreau River	Alkali Creek to mouth	TOTAL DISSOLVED SOLIDS	2004	2017	Low
SD-NI-L-RAHN_01	Rahn Lake	Tripp County	CHLOROPHYLL-A	2010	2022	Low
SD-RD-L-TRAVERSE_01	Lake Traverse	Roberts County	TEMPERATURE	2018	2031	Low
SD-VM-L-E_VERMILLION_01	East Vermillion Lake	McCook County	CHLOROPHYLL-A	2010	2022	Low
SD-VM-L-E_VERMILLION_01	East Vermillion Lake	McCook County	TEMPERATURE	2012	2024	Low
SD-VM-L-HENRY_01	Lake Henry	Kingsbury County	PH (High)	2018	2031	Low
SD-VM-L-SILVER_01	Silver Lake	Hutchinson County	PH (High)	2010	2022	Low
SD-VM-L-THOMPSON_01	Lake Thompson	Kingsbury County	CHLOROPHYLL-A	2014	2022	Low
SD-VM-R-LONG_01	Long Creek	Vermillion River to Highway 44	ESCHERICHIA COLI	2010	2018	High
SD-VM-R-VERMILLION_03	Vermillion River	Baptist Creek to mouth	ESCHERICHIA COLI	2014	2019	Low
SD-VM-R-VERMILLION_E_FORK_01	East Fork Vermillion River	McCook/Lake County line to Little Vermillion River	ESCHERICHIA COLI	2016	2019	High
SD-VM-R-VERMILLION_WEST_FORK_01_USGS	West Fork Vermillion River	Vermillion River to McCook-Miner County Line	ESCHERICHIA COLI	2010	2019	High
SD-WH-L-ALLAN_DAM_01	Allan Dam	Bennett County	PH (High)	2014	2029	Low
SD-WH-R-COTTONWOOD_01	Cottonwood Creek	Headwaters to White River	SPECIFIC CONDUCTIVITY	2004	2029	Low
SD-WH-R-LITTLE_WHITE_01	Little White River	Rosebud Creek to mouth	ESCHERICHIA COLI	2012	2024	Low
SD-WH-R-WHITE_02	White River	Willow Creek to Pass Creek	ESCHERICHIA COLI	2010	2029	Low
SD-WH-R-WHITE_02	White River	Willow Creek to Pass Creek	SALINITY/SAR	2010	2029	Low
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	ESCHERICHIA COLI	2012	2014	Low
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	SALINITY/SAR	2010	2029	Low
SD-WH-R-WHITE_03	White River	Pass Creek to Little White River	TOTAL SUSPENDED SOLIDS	2004	2029	Low
SD-WH-R-WHITE_04	White River	Little White River to confluence with Missouri River	ESCHERICHIA COLI	2010	2029	Low

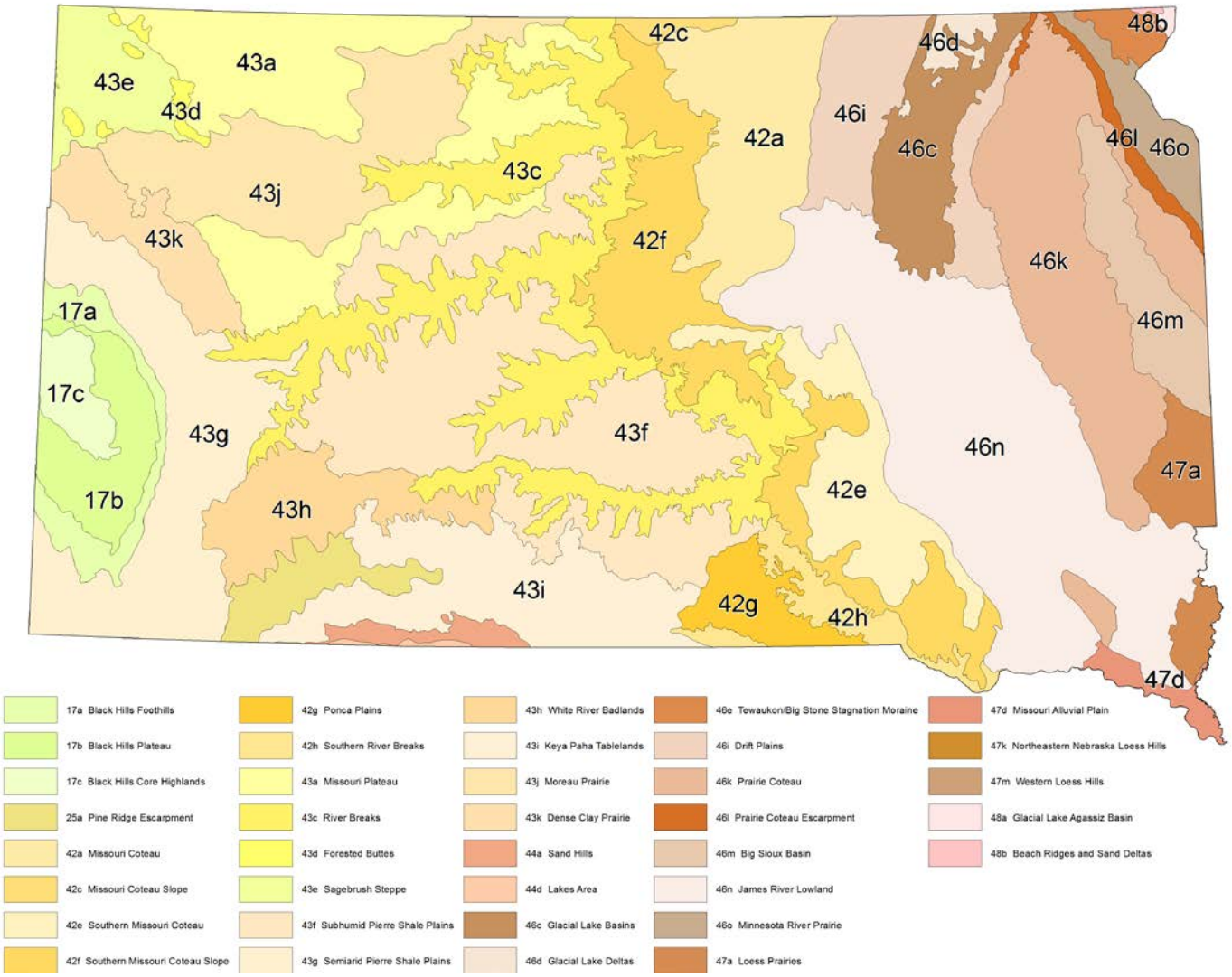
APPENDIX E

ECOREGION MAPS

Level 3 Ecoregion



Level 4 Ecoregion



APPENDIX F

PUBLIC COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8WP-CWQ

MAR 1 9 2018

Shannon Minerich
Surface Water Quality Program
Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol Avenue
Pierre, SD 57501-3181

Re: 2018 South Dakota Integrated Report for Surface Water Quality Assessment

Dear Ms. Minerich:

We have reviewed the Department's draft 2018 Integrated Report (IR) for Surface Water Quality Assessment and appreciate the opportunity to provide feedback. The Department's draft IR is well organized, and we commend your ongoing efforts to utilize common sense language when possible. We also want to recognize the Department's continued efforts to refine an assessment methodology for nutrient-related narrative standards. We look forward to continuing efforts with the Department in this endeavor. We found that information in the IR and GIS files are mostly consistent.

We have some additional comments that should be addressed prior to finalizing the document; these can be found in the attachment. We look forward to receiving your final 2018 IR, and continuing our cooperative efforts. If you have any questions or wish to discuss these comments further, please contact me at (303) 312-6974 or rogers.liz@epa.gov. Again, thank you for your commitment and hard work on the 2018 Integrated Report.

Sincerely,

Elizabeth Rogers
Monitoring and Assessment Team
Water Quality Unit
Office of Water Protection

Attachment

Attachment

EPA's Comments on South Dakota's 2018 Draft Integrated Report (IR)

Main Body of IR:

- Table 2 (Vision Priority Waters) indicates SD-CH-R-CHEYENNE_02 the cause of TSS is dropped as a priority because it is "meeting its uses." That may be an incorrect reason. TSS remains on the 2018 list along with SC and E. coli.
- Table 6 (Nutrient-Related Assessment Status of Stream Assessment Units in Eco-Region 46). In comparing this table from the 2016 IR to the 2018 IR, 4 assessment units (AU) are missing in the 2018 Table. Please correct or explain this discrepancy. Missing AUs are:
    - SD-JA-R-FOOT_01_USGS (Track Assessment Unit)
    - SD-JA-R-MUD_01 (Track Assessment Unit)
    - SD-JA-R-SNAKE_01 (Category 2N)
    - SD-MN-R-LITTLE_MINNESOTA_02 (Category 2N)

DENR Response:

DENR confirmed that segment SD-CH-R-CHEYENNE_02 is impaired and on the 303(d) list for TSS in the 2018 reporting cycle. The reason for removing TSS from this segment as a TMDL Vision Priority for "meeting its uses" was determined to be incorrect. DENR changed the reason for removing TSS from segment SD-CH-R-CHEYENNE_02 to "evaluate TSS standard" in Table 2. DENR believes an evaluation of applicable TSS standards is a higher priority for SD-CH-R-CHEYENNE_02 than TMDL development.

The nutrient-related assessment methodology applies exclusively to perennial wadeable streams in ecoregion 46. Field visits conducted over the past several years have revealed that all four AUs clearly exhibit intermittent or dry conditions. As a result, DENR made the decision to remove the four assessment units (AUs) from Table 6 during the 2018 reporting cycle. A paragraph explaining the absence of the four AUs in question was inserted on page 27 to provide transparency.

Basin Tables:

- SD-GR-R-GRAND_N_FORK_01 has an impairment cause of Specific Conductivity in 2018 303(d) list, but this cause in not identified in the Basin Table, please correct.
- SD-JA-L-MITCHELL_01: temperature is a new cause in the 2018 303(d) list, but this cause is missing in the Basin Table, please correct.

DENR Response:

SD-GR-R-GRAND_N_FORK_01 - Specific conductance has been added to the basin table as a cause of nonsupport of the Irrigation waters beneficial use.

In regards to SD-JA-L-MITCHELL_01, temperature was added as a cause of nonsupport and the EPA category was changed from 4a to 5* in the associated basin table (page 90) to gain consistency with the 303(d) list.*

Fish Consumption Advisories (page 133): Section states: "When determining that a waterbody is not meeting its beneficial uses due to the mercury in fish tissue water quality criterion, DENR does not have the authority to provide advice regarding the consumption of fish from those waterbodies." Please provide more context: i.e., does the Department of Health have this authority?

DENR Response:

The South Dakota Department of Health is the agency that provides public health advice. A statement has been added to the IR text.

Appendix A - EPA Approved TMDL's:

- SD-JA-R-JAMES_11: E. coli moved to 4a in 2018, linked to a 2011 fecal coliform TMDL. There is no new TMDL for this AU/Pollutant combination, please explain.
- SD-BF-R-HORSE_01_USGS: TSS moved to 4a this year even though TMDL approved back in 2005. Assuming this is a correction of an old oversight, please explain.

DENR Response:

SD-JA-R-JAMES_11 – E. coli was in Category 5 in 2016 in both the report and in ADB. When ADB information was migrated to ATTAINS for the 2018 cycle by the contractor, E. coli was erroneously tied to an incorrect TMDL. Unfortunately, DENR did not identify this issue prior to submittal of the draft report. DENR has placed E.coli back on the 303(d) list and updated ATTAINS. DENR found numerous instances where the contractor had erroneously tied incorrect TMDLs to causes. Most of those DENR identified and corrected prior to submitting the draft report.

SD-BF-R-HORSE_01_USGS – Yes. This is a correction from an oversight in 2016. TSS was fully supporting in 2014. In 2016 it was nonsupporting and erroneously placed in Category 5. In 2018 this oversight was identified and TSS was linked to the existing TMDL and moved to Category 4a.

Appendix B - Delistings:

- SD-CH-R-CHEYENNE_02 is delisted for salinity/SAR and TDS but remains listed for specific conductance. Given the close relationship between these three parameters, please explain the reasoning for this assessment decision.

DENR Response:

SD-CH-R-CHEYENNE_02 – South Dakota has separate water quality standards for SAR, TDS, and specific conductance and assesses each one individually. During this 2018 assessment cycle, TDS had an exceedance rate of 7% and SAR had an exceedance rate of 5%; both are below our listing threshold of 10%. Therefore DENR determined they were supporting those standards and delisted them. Specific conductance, however, had a much higher exceedance rate of nearly 31% and remains on the 303(d) list.

Appendix C – AUIDs Where Fecal Coliform Was Removed as a Cause:

- There appear to be some inconsistencies regarding AUs with the removed cause of Fecal Coliform (FC). Please ensure that references to the FC cause is consistent between Appendices B, C and the Basin Tables.

DENR Response:

Appendix C lists the reaches where fecal coliform was removed as a cause. This includes fecal coliform that were in Categories 4a or 5. Appendix B is the delisting report and only contains reaches where fecal coliform was in Category 5 and was delisted (WQS no longer applicable). Appendices B and C are not expected to match.

Appendix D - 303(d) List:

- SD-BS-R-BIG_SIOUX_07 had an impairment cause of TSS in 2016. In 2018 it was not delisted for TSS, but this cause isn't on the 303(d) list, please correct.
- SD-JA-L-FAULKTON_01 has Chlorophyll-a as a cause in the 2018 Basin Table, but this cause is missing in the 303(d) list, please correct.
- SD-CH-L-SHERIDAN_01 had a previous Dissolved Oxygen impairment, which is not included on the 2018 303(d) list, it appears it was not delisted for this cause. This cause is found in the Basin Table, but is missing in the 303(d) list, please correct.

DENR Response:

SD-BS-R-BIG-SIOUX_07 was listed for TSS in 2004. In 2006 it was delisted because new data showed it was meeting the TSS criterion. Additionally, a TMDL was approved in 2008. In 2016, data showed it was not supporting the TSS criterion and it was moved directly into Category 4a and tied to the existing TMDL. Because this reach already had an approved TMDL it was not placed on the 303(d) list and does not need to be on the delisting report.

A nutrient TMDL was assigned to SD-JA-L-FAULKTON_01 for chlorophyll-a during the 2014 reporting cycle. Lake Faulkton continues to be non-supporting for chlorophyll-a but is not on the 303(d) list in 2018 due to the TMDL (Appendix A). Lake Faulkton is on the 303(d) list for dissolved oxygen.

The cause dissolved oxygen for SD-CH-L-SHERIDAN_01 was mistakenly assigned to a phosphorus TMDL in the ATTAINS system by the contractor during the migration from ADB. DENR removed the TMDL for dissolved oxygen in ATTAINS and added it to the 303(d) list.

Tribal Waterbodies:

Some AUs appear to be located within Indian country. As stated in previous IR reviews, the EPA's review of South Dakota's Section 303(d) list does not extend to Indian country as defined in 18 U.S.C. Section 1151. Indian country generally includes lands within the exterior boundaries of the following Indian reservations located within the State of South Dakota: Cheyenne River Reservation, Crow Creek Reservation, Flandreau Santee Sioux Reservation, Lower Brule Reservation, Pine Ridge Indian Reservation, Rosebud Indian Reservation, Standing Rock Reservation, and Yankton Sioux Reservation; any land held in trust by the United States for an Indian tribe; and any other areas that are "Indian country" within the meaning of 18 U.S.C. Section 1151. Lands removed from reservations by judicial action are not considered lands within the exterior boundaries of an Indian reservation. EPA, or eligible Indian tribes, as appropriate, will retain responsibility under Section 303(d) for waters in Indian country.

DENR Response:

EPA's recognition of tribal waterbodies as they pertain to South Dakota's 303(d) list is noted by DENR.

EAST DAKOTA
WATER
DEVELOPMENT
DISTRICT

March 19, 2018

Paul Lorenzen
SD DENR - Watershed Protection Program
523 East Capitol Avenue
Pierre, South Dakota 57501-3181

Dear Mr. Lorenzen:

I am writing to offer comments on behalf of the East Dakota Water Development District on the DRAFT 2018 South Dakota Integrated Report for Surface Water Quality Assessment (DRAFT IR). For each I have included a page reference from the DRAFT document.

1. Page 8. In prior versions of the Integrated Report, readers were provided a table (Table 2: Numeric Criteria Assigned to Beneficial Uses of Surface Waters of the State ARSD 74:51:01, in the 2016 IR for example) that laid out the various beneficial uses and the individual chemical, physical or biological parameters that were measured to assess use attainment. In the DRAFT IR, the reader is simply provided a link to the general Administrative Rules of South Dakota (ARSD) where the standards are listed. I would note that the chapter to which the reader is directed contains **76** separate sections, along with three appendices. The table should be restored to facilitate better understanding by the general public.

DENR Response:

The intent of Tables 2 and 3 in previous reporting cycles was to provide the reader with a "basic" overview of the beneficial use designations and associated conventional and toxic water quality standards and criteria assigned to those uses. The water quality standard limits for each parameter serve as benchmarks to make beneficial use support determinations and impairment decisions in conjunction with the 303(d) listing methodologies. Not all parameters are measured at individual waterbodies. Support determinations are based on a subset of available parameters.

During the 2018 reporting cycle, DENR made an attempt to clean up the document by examining the relevance of all information used in past reports. DENR determined that tables 2 and 3 (2016 IR) were essentially incomplete in comparison to the information provided in ARSD article 74:51; Surface Water Quality Standards. The Surface Water Quality Standards contain site-specific standards and other special conditions that apply to

individual or groups of waterbodies in South Dakota, which is not depicted in the basic information provided in Tables 2 and 3. DENR agrees that the Surface Water Quality Standards can be complex. However, it is not reasonable to summarize the standards without compromising accuracy. DENR provided readers with an easy access web link to the standards document. The department's website contains several communication avenues in the event readers have questions with content. This change was supported by EPA during the 2018 IR development process as part of a campaign to eliminate duplicative information or information that exists electronically in some other location such as the department's website.

DENR is using EPA's ATTAINS system as the platform to report IR information as described in paragraph 4 of page 2 in the 2018 IR. A goal of EPA's ATTAINS system is to help streamline IR information and make it easier for the general public to access specific information. DENR anticipates that the ATTAINS system will provide a reporting element that allows the public to view all water quality parameters used to make support determinations for all assessed waterbodies in South Dakota.

2. Page 11, Fish Contaminants Sampling. No mention is made of the 0.3 mg/kg mercury fish flesh standard that SD DENR uses. In that there are numerous impairments attributed to elevated Hg in the report, it would seem appropriate to note the difference in approach between SD DENR and the SD Department of Health.

DENR Response:

The existing statement on page 11 has been updated to include (0.3mg/kg) and reads as such "DENR also uses mercury in fish tissue results to assess the mercury in fish tissue water quality criterion ***(0.3mg/kg)*** *and determine waterbody support." Additional information, including differences in approach, is located on page 133. The paragraph heading Fish Consumption Advisories has been updated to Fish Flesh Contaminants to more accurately reflect the content.*

3. Page 13, TMDL Prioritization of 303(d) Listed Waters. Water listed as impaired because of "mercury in fish flesh" are listed as top priority for TMDL development. However, on page 38, fourth paragraph, it states that global atmospheric deposition is the primary mercury source, and as such little change can be expected until global-scale reduction measures take place. These two concepts appear to be at odds.

DENR Response:

DENR anticipated that many waterbodies would be considered impaired in the 2016 IR following the states adoption of EPA's national criterion for mercury in fish flesh (0.3 mg/kg). DENR decided to be proactive by producing a statewide mercury in fish flesh TMDL based on EPA guidance and models from other states to eliminate the exhausting alternative of producing individual TMDLs for all impacted water bodies. DENR considered completion of the statewide mercury TMDL a top priority for the 2016 IR to eliminate the need to place waterbodies on the 303(d) list. Most waterbodies impaired for mercury in fish flesh during the 2016 reporting cycle were placed in category 4a (impaired with a TMDL).

DENR began to draft the statewide mercury TMDL during the development of the TMDL vision and priority schedule. EPA encouraged DENR to add the mercury TMDL to the TMDL Vision and priority schedule to facilitate review and approval to coincide with the 2016 IR. Waterbodies on the 303(d) list require a TMDL be written regardless if the pollution source is outside the state's borders.

4. Page 21, Table 3: Criteria for Determining Support Status. It states that for both "FOR CONVENTIONAL PARAMETERS," and "FOR MERCURY IN FISH TISSUE," a minimum of 10 samples are required to determine Support Status, with the data to have been collected between either January 2007 and September 2017 (for lakes or mercury in fish tissue, or from October 1, 2012 and September 30, 2017 for streams). Although not articulated, it is commonly known that for conventional parameters, each water sample is meant to be a separate sample collected on different dates. By inference, most readers would assume the same would true for the HG samples. However, such is not the case. Mercury in fish tissues data commonly comes from a single sampling event, at which time multiple individual fish are collected, each of which is counted as a discrete and separate sample.

I believe that it is imperative that this distinction be highlighted. The differences are profound, and should be noted.

DENR Response:

The words "collected on separate days" has been added to Table 3 under Minimum Sample Size for Conventional Parameters.

Mercury in fish tissue is accumulated over the lifespan of the fish and represents the long-term exposure to methylmercury in a waterbody. Mercury concentration in fish tissue may vary over time based on environmental changes in the waterbody. In South Dakota, concentration changes are mainly caused by changes in water levels and the resulting inundation of land. Also, seasonal changes in diet result in seasonal variations in fish tissue mercury concentration. However, even a single sampling event, collecting and analyzing a minimum of ten fish is representative due to the bioaccumulative nature and slow elimination rate of methylmercury in fish tissue. To highlight this profound difference as noted, the Minimum Sample Size for Mercury in Fish Tissue in Table 3 has been updated to read:

ALL Lakes and Streams: A minimum of 10 tissue samples are required. No minimum number of sample events. All available data from January 2007 through September 2017 was used.

5. Page 35. The third paragraph provides general observations about trends in the data between the 2014, 2016 and current (2018) IR. In the sixth paragraph, the reader is referred to Tables 10 and 11in which category status comparisons are presented. However, the final paragraph of the Executive Summary (page 7) appears to caution the reader from drawing such conclusion. Again, these sections appear to be mutually contradictory.

DENR Response:

The purpose of the third paragraph is to provide an explanation for the decrease in use support from the previous cycles due to changes in water quality standards and assessment methodology. This paragraph is not contradictory at all to the paragraph on page 7, but rather supports DENR's assertion that comparing assessment results between cycles should be avoided due to the factors described on page 7.

6. Page 60, second paragraph. Reference is made to data having been provided by the NE DEQ. I suspect the intent was to cite the Iowa DEQ.

DENR Response:
NE DEQ has been removed from page 60. NE DEQ provided data for the Missouri River basin.

7. Page 60, paragraph 5. The long-term water quality monitoring project cited was (is) sponsored by SD DENR and East Dakota. The best management practices being studied are supported by NRCS and the City of Sioux Falls, but the WQ work is not.

DENR Response:
DENR revised the paragraph to appropriately depict the correct agencies responsible for providing support to the different aspects of the project.

8. Page 61, second full paragraph. This speaks at length about mercury in fish tissue, but only mentions lakes. While they may well account for the majority of the impaired water bodies in this watershed, there is also a Big Sioux River segment (see page 67, SD-BS-R-BIG_SIOUX_07) identified as impaired for this reason. This too needs to be discussed, in particular because unlike lakes, the "impaired' fish could easily move between pretty much all river segments with ease.

DENR Response:
Language has been added to page 61 identifying that one reach in the Big Sioux River had sufficient data to determine that the reach is nonsupporting for mercury in fish tissue and that sampling of additional reaches is scheduled.

9. Page 61, last paragraph. Between them, while the Upper BSR and BSR Watershed Projects cover a majority of the basin, they are not all inclusive. At present, the river and its watershed between Watertown and Estelline are not part of a formal project.

DENR Response:
DENR corrected the language on page 61, last paragraph, to specify that the collective watershed projects did not include the watershed area between Watertown and Estelline.

10. Page 67 (Table 22). For segment SD-BS-R-BIG_SIOUX_07, Mercury in Fish Tissue is cited as the cause of non-support of both beneficial uses 9 (Fish/Wildlife Prop, Rec., Stock) and 5 (Warmwater Semipermanent Fish Life). As in the 2016 IR, the preceding six river segments and the following nine river segments show no such listing. For the casual reader of this report, the message is that while caution should be exercised if eating fish from segment 07, the fish in the other 15 segments are ok.

However, such is not the case. Mercury in fish tissue data is available for only a limited number of water bodies. In the case of the Big Sioux River, the only samples tested for the entire river was from a single sampling event along segment 07 in 2012 (I understand that 19 fish were sampled at this event.) . No other samples have been collected, and therefore no other status reports can be made. As such, while it would be appropriate to assume that

some water bodies are "safe" with regard to mercury, the truth is that the vast majority would fall under the insufficient data category. The presentation of this critical information needs to be amended in such a way as to reflect what is actually known.

In summary, I would once again strongly encourage the SD DENR to re-write the portions of this report that address mercury in fish tissue data. Tables 20 thru 33 list the water bodies (lakes, rivers and streams), by major watershed, for which use attainment information is available. For each water body any assigned beneficial use is listed, along with whether or not each beneficial use is supported or not. The numeric criteria used to determine support of each beneficial use are found in Table 2 (page 10). If there is insufficient data to draw a conclusion, this is so indicated. Except for mercury in fish tissue data, which only cited as a problem. Based on the criteria noted above (support, non-support or insufficient data), the casual reader of this document would presume that for those water bodies for which there is no "Mercury in Fish Tissue"-based impairment that it has been determined that mercury concentration in fish in these water bodies is below 0.3 mg/kg. This is clearly not the case, and should be stated as such.

DENR Response:

DENR has hundreds of water quality standards that apply to all waters of the state. Unfortunately, DENR does not have the resources to sample all waterbodies for all parameters. Support determinations in the IR are made based on existing available data and do not require that all possible parameters be sampled in order to make a support determination. The support determination of "Insufficient" is only used when there is not enough data of any kind to make a determination. DENR recognizes that mercury in fish tissue is an important water quality criterion and attempts to sample waters that support fish, have public access, and receive angling pressure from the public. Additional reaches on the Big Sioux and James Rivers are scheduled for sampling so that DENR may provide greater information on mercury in fish tissue for additional river reaches.

As mentioned in the IR document on page 4, EPA is in the process of redesigning the ATTAINS system. For this 2018 IR cycle, DENR has added most parameters that meet their beneficial use to the ATTAINS system, and has included all mercury support determinations, including those reaches that fully support the associated beneficial uses. The public can find information on which reaches are fully supporting for parameters, including mercury in fish tissue, on the ATTAINS website. A paragraph with this information has also been added to the River Basin Water Quality Assessments on page 45.

Additionally, as mentioned on page 133, a list of waterbodies that have been sampled for fish flesh contaminants is available at: http://denr.sd.gov/des/sw/fish.aspx. The text also states that not all waterbodies in this report have been assessed for mercury in fish tissue. It is the responsibility of the reader to review the information provided in this document and not make assumptions based on a cursory review of selected paragraphs.

In testimony to the Joint Appropriations Committee of the 2018 South Dakota Legislature, on January 16th, 2018, Secretary Steve Pirner identified the Integrated Reports as the mechanism by which DENR makes water quality data available to the general public. As such, it is imperative that the document be clear, concise and readily understandable by the general public. In its current form, such is not always the case, and until such time as a more user-friendly mechanism is developed, greater care must be exercised when presenting water quality data.

Thank you for your consideration of these comments. If you have any questions about the points that I have raised, please do not hesitate to contact me. As always, I applaud the Department's work on what can only be described as a herculean effort.

Sincerely,

Jay P. Gilbertson
Manager/Treasurer

DENR Response:

All states in the country including South Dakota are required by EPA under authority of the federal Clean Water Act sections 303(d), 305(b) and 314 to report on surface water quality by April 1st of every even year. EPA submits state reports to members of the United States Congress as a tool to inform national water quality decisions. DENR is the primary agency responsible for completing the Integrated Report (IR) for Surface Water Quality in South Dakota. The structure and focus of the report follows closely with requirements and recommendations specified by EPA guidance. By following EPA guidance, contents of the report may be limited or may be difficult to interpret by not only members of the general public, but also a host of water quality professionals in South Dakota. Nonetheless, the reference to Secretary Steve Pirner regarding the use of the IR as the mechanism by which DENR makes water quality data available to the general public is absolutely true. The report has been used by federal, state and local entities plus members of the general public to make water quality decisions for over 20 years.

As mentioned in responses to select comments above, DENR is using EPA's new ATTAINS system to report IR-related information. The reporting capabilities of ATTAINS are designed to replace a printed IR document. EPA designed ATTAINS on the premise that information in state IRs need to be streamlined and provide a mechanism for users to gain greater transparency from the results of the state's water quality assessments. DENR is confident that the ATTAINS system and reporting capability will aid in resolving many of the transparency issues described in your comments.

Moody Conservation District

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March 16, 2018

Paul Lorenzen
SD DENR
Joe Foss Building
523 E. Capitol
Pierre, SD 57501

Mr. Lorenzen,

The Moody Conservation District Board of Supervisors have discussed the draft 2018 South Dakota Integrated Report for Surface Water Quality Assessment report and have the following concerns for the information provided in this draft report about the water bodies in Moody County.

Our major concern is the identification of 'mercury impairment' in the Big Sioux River on page 67 from the Brookings/Moody County Line to Section 2 of Dell Rapids Township in Minnehaha County. We have been told there 19 fish caught by the SDGF&P in the river about 5 years ago and one tested positive for mercury. To our knowledge there has not been another fish caught in the Big Sioux River since then that tested positive for mercury. Plus, we don't see this sampling meeting DENR's 'Fish Contaminants Sampling Protocol' requirements that specify up to 45 fish need to be tested to make this determination. We know many lakes in the Big Sioux River Watershed have been identified for mercury impairment but Moody County does not have any lakes in it, so we think the fish could not have originated in Moody County. That raises the questions as to whether the fish originated in the river; did it migrate from a mercury impaired lake in the upper basin; or was it misidentified after it was caught. The other concern we have is that the Big Sioux River is a free flowing river, so how can just Moody County be identified as being impaired for mercury and the rest of the river is not.

DENR Response:

Attached is the fish tissue data for the Big Sioux River SD-BS-R-BIG_SIOUX_07. There were nineteen fish collected in 2012. All nineteen fish tested positive for mercury. Six of those fish were above the water quality criterion of mercury in fish tissue of 0.3mg/kg. Our assessment methodology in Table 3 indicates For Mercury in Fish Tissue – a minimum of 10 samples are required; these samples must be collected within the date range of January 2007 through September 2017; and in order to determine nonsupport, the 95th percentile of data must exceed the water quality criterion of 0.3mg/kg mercury OR when a fish consumption advisory has been issued. As you can see from the table provided below, the nineteen fish collected meet the minimum sample size of 10 and the sample year of 2012 is within the sample period. This reach was listed as nonsupporting for mercury because the 95th percentile of the mercury concentration was 0.688 and therefore exceeds the criterion of 0.3mg/kg.

The Big Sioux River SD-BS-R-BIG_SIOUX_07 is the only reach of the Big Sioux that had fish tissue data that met the requirements in Table 3. Other reaches of the Big Sioux River either did not have data that met the requirements in Table 3 or have not been sampled. DENR acknowledges this discrepancy and has added

reaches of the Big Sioux River to the 2018 fish tissue sampling agenda. Therefore, in the 2020 IR, DENR should have mercury fish tissue data and support determinations on other reaches of the Big Sioux River.

We also noticed other inconsistencies in the information provided in the report as it relates to the Big Sioux River and its tributaries in Moody County which are:

a. In Table 22, page 67 and Appendix A it shows a TMDL with an EPA Category 5* was approved for the Big Sioux River in Moody County but the map on page 71 shows the river in Moody County as impaired without an approved TMDL (5).

   DENR Response:
   This reach of the Big Sioux has an approved TMDL for mercury in fish tissue – this is noted in Appendix A. Also, the asterisk is used to alert the reader that there is an approved TMDL associated with the waterbody. This reach is in Category 5 because it is nonsupporting and requires a TMDL for both E. coli and TSS.

b. The Big Sioux River, Skunk Creek, and Flandreau Creek have a 5* EPA Category code. How can a water body be identified as a Category 5* when a '5' identifies it as a 'Water impaired/requires a TMDL' and an '*' identifies it as a 'Waterbody has an EPA approved TMDL'?

   DENR Response:
   5 is the EPA Category. The asterisk is a DENR notation to alert the reader that an approved TMDL exists even though the TMDL may be for a different cause than what it is listed for. In these cases, Skunk Creek and Flandreau Creek both have approved TMDLs for fecal coliform (hence the asterisk) but are both nonsupporting for E.coli. Therefore, they are placed in Category 5 because a TMDL is required for E.coli.

c. In the 2016 Integrated Report, Spring Creek was identified as being impaired for fecal coliform with and EPA Category 4* (Water impaired but has an approved TMDL). In this report on page 69, it has Spring Creek listed as an EPA Category 3* (3 meaning 'Insufficient data' and a * meaning 'Waterbody has an EPA approved TMDL'). How can you have a water body listed as impaired in 2016 and have insufficient data in 2018? Also, in Appendix A, page 154, it shows Spring Creek as being impaired for fecal coliform, which is inconsistent with page 69.

   DENR Response:
   In 2008, Spring Creek was listed as nonsupporting for fecal coliform and placed in Category 5. Later that year, a fecal coliform TMDL was approved. In 2010, the reach was delisted because of the approved TMDL and it was placed in Category 4a. The reach remained in Category 4a because additional data was not collected and no other determination could be made. That is why Spring Creek continued to be in Category 4a for fecal coliform in 2016. DENR removed the water quality standard for fecal coliform in 2017 (EPA approved in 2017). In the 2018 IR, fecal coliform was removed as a cause. Because Spring Creek did not have any data collected within the date range specified on Table 3, it was assigned as Category 3. Appendix A is a compilation of South Dakota waterbodies that have approved TMDLs and is for informational purposes only. Appendix A does not make any reference to support status or category.

d. In Appendix A, page 154, it also has Jack Moore Creek listed for fecal coliform impairment but that tributary is not listed in Table 22 or identified as being impaired on the Big Sioux River map.

DENR Response:
Appendix A is a compilation of South Dakota waterbodies that have approved TMDLs and is for informational purposes only. Appendix A does not make any reference to support status or category. Appendix A shows that Jack Moore Creek has an approved TMDL for fecal coliform. Jack Moore Creek was removed from the IR in 2018 because it is not being sampled and DENR does not have any plans to sample it in the foreseeable future. Although the reach was removed from the IR and will not be assessed, the TMDL still exists.

Thank you for this opportunity to provide comments to this draft of the report and let me know if you have any other questions about them. I appreciate knowing if DENR concurs with them or if we misinterpreted the information we received about the mercury sampling or the wording in the draft report. Thanks.

Jack Majeres, Chairman
Moody Conservation District

Mercury in Fish Tissue Data for SD-BS-R-BIG_SIOUX_07

AUID	Sample Year	Species	Mercury (ppm)	Length (mm)
SD-BS-R-BIG_SIOUX_07	2012	Channel Catfish	0.22	332
SD-BS-R-BIG_SIOUX_07	2012	Channel Catfish	0.38	407
SD-BS-R-BIG_SIOUX_07	2012	Channel Catfish	0.3	474
SD-BS-R-BIG_SIOUX_07	2012	Channel Catfish	0.22	502
SD-BS-R-BIG_SIOUX_07	2012	Channel Catfish	0.15	555
SD-BS-R-BIG_SIOUX_07	2012	Shorthead Redhorse	0.14	371
SD-BS-R-BIG_SIOUX_07	2012	Shorthead Redhorse	0.16	376
SD-BS-R-BIG_SIOUX_07	2012	Shorthead Redhorse	0.42	412
SD-BS-R-BIG_SIOUX_07	2012	Shorthead Redhorse	0.3	330
SD-BS-R-BIG_SIOUX_07	2012	Shorthead Redhorse	0.24	352
SD-BS-R-BIG_SIOUX_07	2012	Walleye	0.37	350
SD-BS-R-BIG_SIOUX_07	2012	Walleye	0.66	435
SD-BS-R-BIG_SIOUX_07	2012	Walleye	0.74	456
SD-BS-R-BIG_SIOUX_07	2012	Walleye	0.64	486
SD-BS-R-BIG_SIOUX_07	2012	Common Carp	0.21	451
SD-BS-R-BIG_SIOUX_07	2012	Common Carp	0.23	638
SD-BS-R-BIG_SIOUX_07	2012	Common Carp	0.22	611
SD-BS-R-BIG_SIOUX_07	2012	Common Carp	0.05	447
SD-BS-R-BIG_SIOUX_07	2012	Common Carp	0.11	522
		95th Percentile	**0.668**	